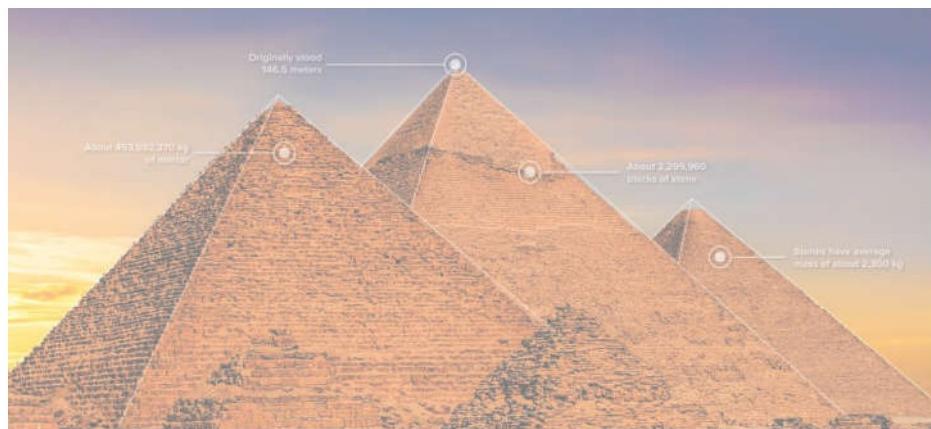


MATHEMATICS

PRIMARY FIVE

FIRST TERM

PART (1)





Unit 12

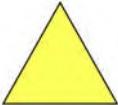
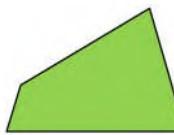
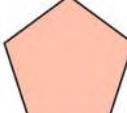
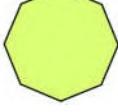
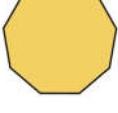
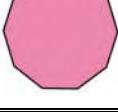
Geometry



Concept (1)

Points, Lines, Rays, and Plane Figures

Polygons

The Polygon	Name	Number of sides	Number of vertices
	Triangle		
	Quadrilateral		
	Pentagon		
	Hexagon		
	Heptagon		
	Octagon		
	Nonagon		
	Decagon		

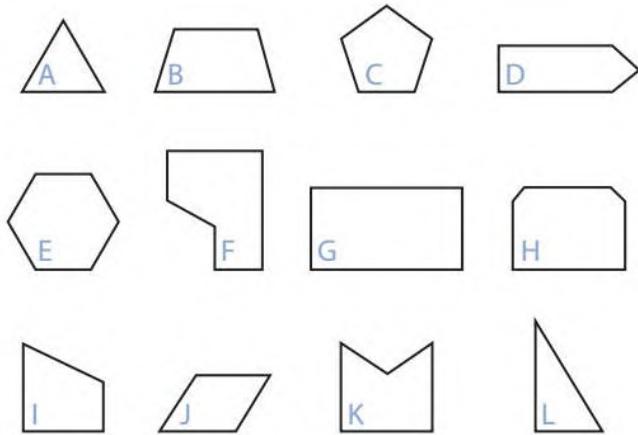
Note: For any polygon:

Number of sides = Number of vertices



Lesson (1): Two Dimensional Shapes

Similar Shapes Look at the shapes. Choose two shapes that have something in common. Write the letters of the shapes you chose, and then write 1–2 sentences describing what the shapes have in common.



1. Shape _____ and Shape _____ are similar because _____

2. Shape _____ and Shape _____ are similar because _____

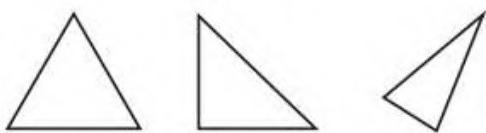
3. Shape _____ and Shape _____ are similar because _____

4. Shape _____ and Shape _____ are similar because _____



Identifying and Drawing Shapes Record the name of the shape, the number of sides, and the number of vertices.

1.

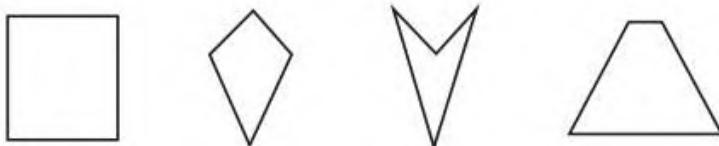


Name _____

Number of Sides _____

Number of Vertices _____

2.

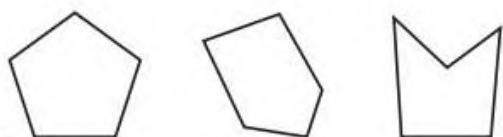


Name _____

Number of Sides _____

Number of Vertices _____

3.

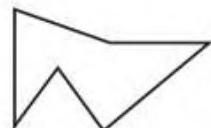
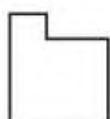


Name _____

Number of Sides _____

Number of Vertices _____

4.

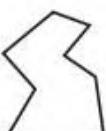


Name _____

Number of Sides _____

Number of Vertices _____

5.



Name _____

Number of Sides _____

Number of Vertices _____

6. Draw a polygon with 3 sides and 3 vertices.

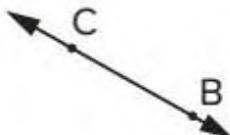
7. Draw a polygon with 4 sides and 4 vertices.

8. Draw a polygon with 5 sides and 5 vertices.

9. Draw a polygon with 6 sides and 6 vertices.



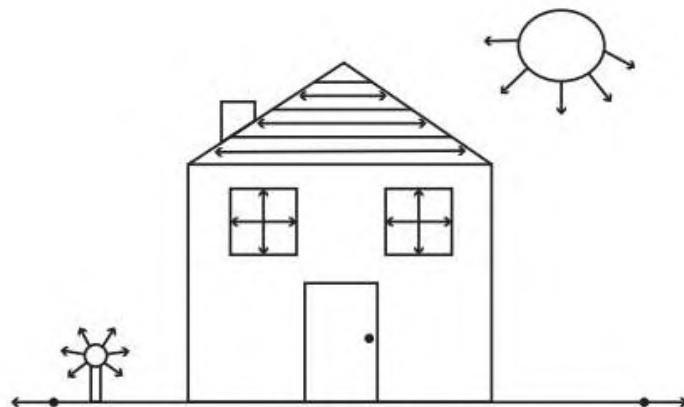
Lesson (2): Points, Lines, Line Segments, and Rays

	line YZ	
	line segment BC	
	line BC	
	ray BC	
	line segment YZ	
	ray YZ	

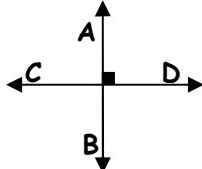
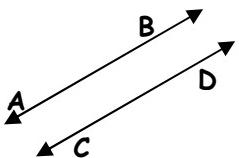
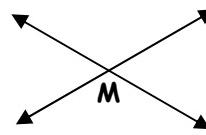


House of Rays, Line Segments, and Lines Look at the picture that follows.

- Trace any lines you see in green.
- Trace any rays you see in orange.
- Trace any line segments you see in blue.



Lesson (3): Types of Lines:

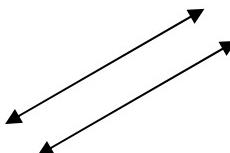
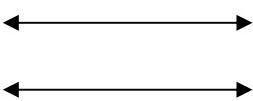
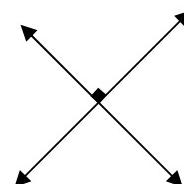
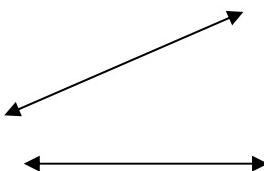
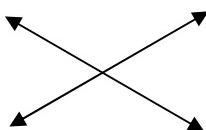
Perpendicular Lines (Orthogonal lines)	Parallel Lines	Intersecting Lines
 <p>1. Intersect at 1 point. 2. Make 4 right angles. 3. $\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$ or $\overleftrightarrow{CD} \perp \overleftrightarrow{AB}$.</p>	 <p>1. $\overleftrightarrow{AB} \parallel \overleftrightarrow{CD}$ or $\overleftrightarrow{CD} \parallel \overleftrightarrow{AB}$. 2. Intersect at 0 points 3. Never intersecting.</p>	 <p>1. Intersect at 1 point. 2. M is the intersection point 3. Make 4 angles: 2 acute, 2 obtuse.</p>
		

Complete:

- (1) Any two lines that never intersect are called
- (2) Any two lines that intersect at a point and make four right angles are called
- (3) The two intersecting lines intersect at point (s).
- (4) The two parallel lines intersect at point (s).
- (5) The two parallel lines make angles.
- (6) Two lines, if one angle at the intersection point of them is right, then the two lines are called
- (7) Two lines, if one angle at the intersection point of them is acute, then the two lines are called

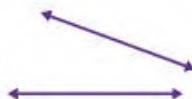


Write (parallel, perpendicular or intersecting) to describe each two straight lines:



Intersecting or Not? Look at the pairs of lines and rays in the pictures below. For each picture, extend the lines or rays see if the line segments are intersecting or parallel. Hint: Rays can only extend in one direction.

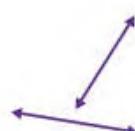
1.



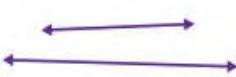
2.



3.



4.



5.



6.



Writing About Math Decide whether each statement is true or false. Explain your reasoning.

1. All intersecting lines are perpendicular.

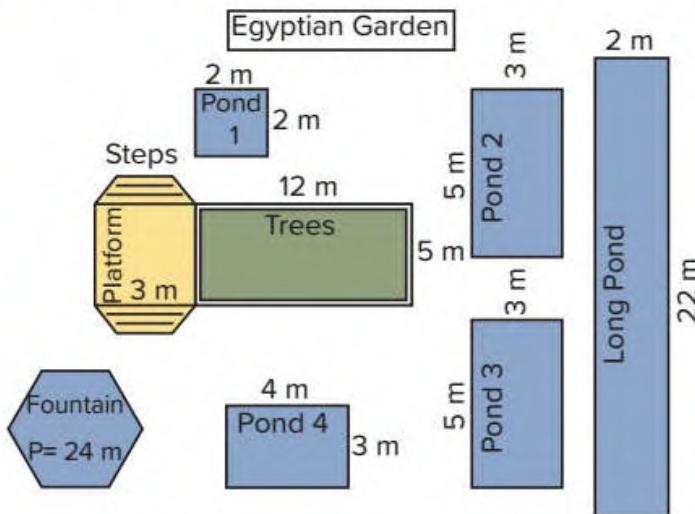
2. Two lines that never intersect must be parallel.

3. All perpendicular lines are intersecting lines.



Lesson (4): Area and Perimeter of Polygons:

Analyzing a Garden Use the drawing to answer questions about perimeter and area.

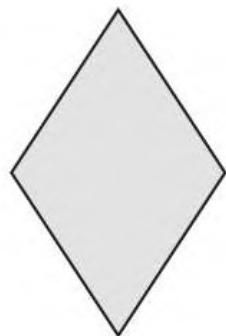


1. What is the area of Pond 1? _____
2. What is the perimeter of Pond 4? _____
3. What is the area of the center section of trees? _____
4. What is the area of the long pond? _____
5. What is the perimeter of Pond 3? _____
6. What is the perimeter of Pond 2? _____
7. The perimeter of the fountain is 24 meters. If each side is the same length, what is the length of each side? Explain how you know. _____
8. What section of the garden has an area of 12 square meters? _____
9. What is the combined perimeter of Ponds 2 and 3? _____
10. **Challenge:** What is the area of the platform? How did you find your answer?



1. Which shape is a pentagon?

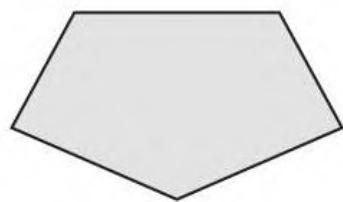
A.



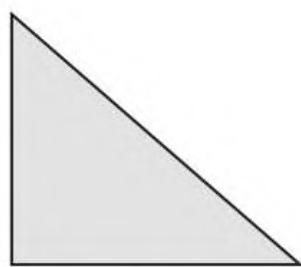
B.



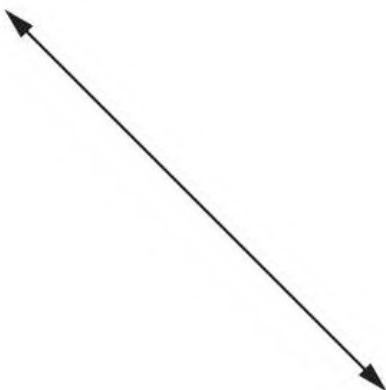
C.



D.



2. What is the name of this object?



A. Point

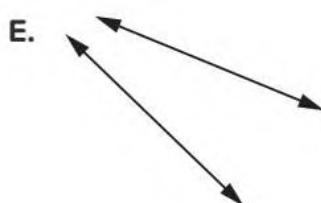
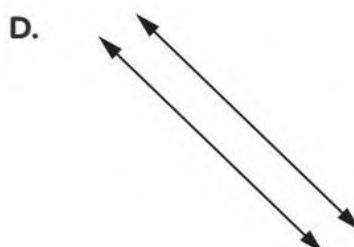
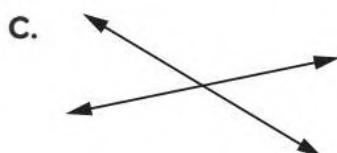
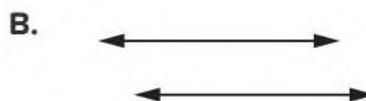
B. Line

C. Line segment

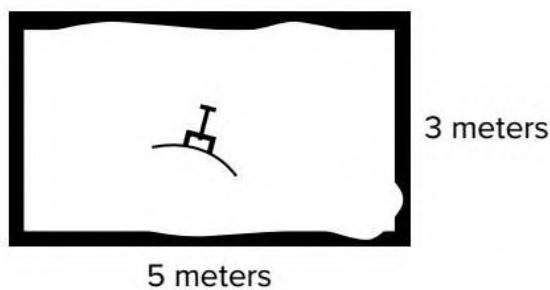
D. Ray



3. Which of these show intersecting lines? Select two correct answers.



4. Fatma's sandbox is 3 meters wide and 5 meters long. What is the area of the sandbox?



- A. 5 square meters
- B. 8 square meters
- C. 15 square meters
- D. 16 square meters



5. Fill in the blanks below with the correct answer choice from each group.
 Salem's painting is 20 centimeters wide and 30 centimeters long. How can he find the perimeter of the painting?



20 centimeters

30 centimeters

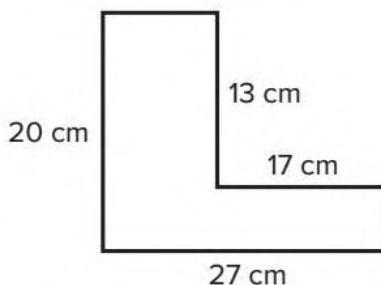
A.	add multiply
----	-----------------

B.	$20 + 30$ $20 + 30 + 20 + 30$ 20×30 $2 \times (20 \times 30)$
----	---

C.	50 100 600 1,200
----	---------------------------

He can A. _____ B. _____ to find that
 the perimeter is C. _____ centimeters.

6. All of the sides of the polygon shown intersect to form right angles.

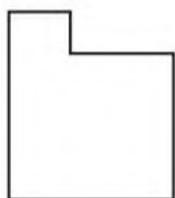
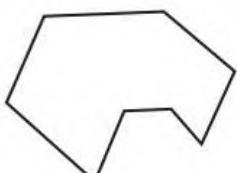


What is the perimeter, in centimeters, of the polygon?

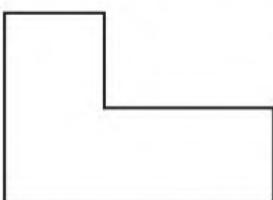


Homework

1. Circle the octagon.

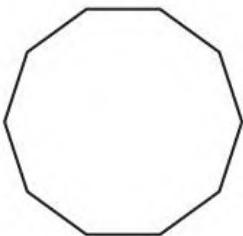


2. What shape is this?



3. True or false: A quadrilateral has 4 sides and 3 angles.

4. Record the attributes of this shape.



Sides: _____

Vertices: _____

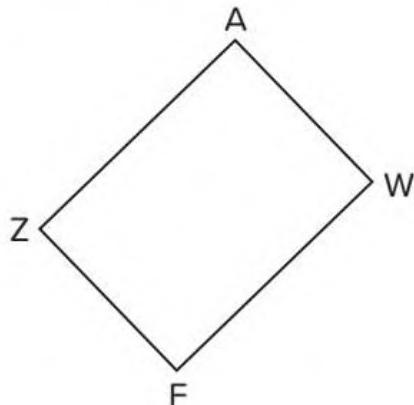
5. True or false: A polygon has the same number of sides as angles.



Draw a line to match the name to the picture. Some pictures do not have a match. Label pictures that do not have a match (for example, line segment ST or TS).



Use the shape to answer Questions 1 and 2.



1. Look at the shape. Name two perpendicular line segments.
2. Look at the shape. Name two parallel line segments.
3. Draw Line AB so that it is parallel to Line CD.
4. Draw Ray WX so that it is perpendicular to Line Segment YZ.



1. Mohamed walks around the perimeter of the park every day. The length of the park is 15 meters and the width is 12 meters. How many meters does Mohamed walk every day?
 2. If you are measuring the amount of carpet you will need to cover an entire room, you are determining the _____ of the room.
 3. Use a ruler to draw a rectangle that has a length of 8 centimeters and a width of 4 centimeters.
 4. What is the area of the rectangle you drew?
 5. What is the perimeter of the rectangle you drew?

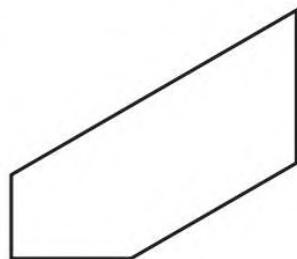


1. Aya drew a figure with the following attributes:

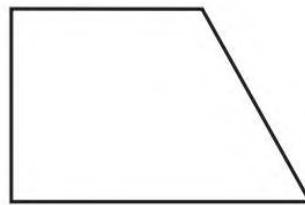
- The figure is a pentagon.
- Two pairs of sides are perpendicular.
- One pair of sides is parallel.

Which could be the figure Aya drew?

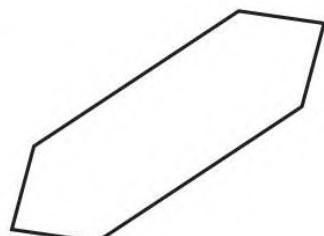
A.



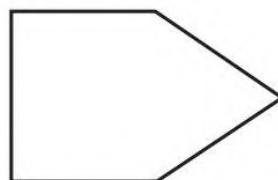
B.



C.



D.

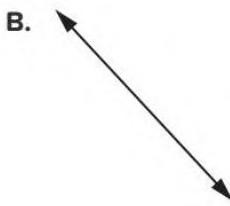


2. Which of these are rays? Select two correct answers.

A.



B.



C.



D.



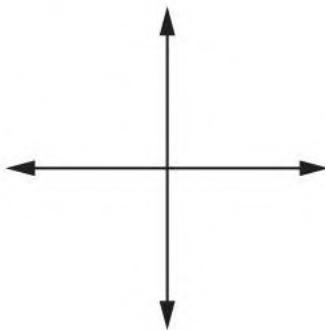
E.



F.



3. Which term *best* describes the lines?

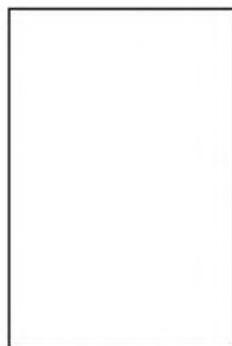


- A. Line segments
- B. Unequal lines
- C. Parallel lines
- D. Perpendicular lines



4. Fill in the blanks below with the correct answer choice from each group.

Hossam uses a box with a lid that is 8 centimeters wide and 12 centimeters long. How can he find the area of the lid?



A.

4
8
20
96

B.

4
12
40
96

C.

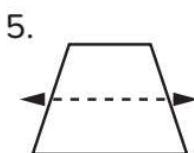
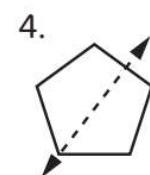
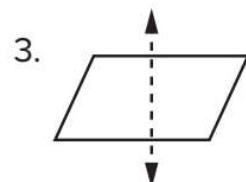
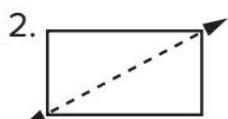
8
12
40
96

He can multiply A. _____ by B. _____ to find that the area is C. _____ square centimeters.

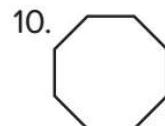
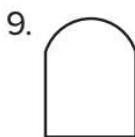
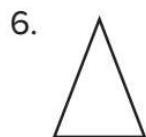


Lesson (5): What Is Symmetry?

Lines of Symmetry For Problems 1–5, look at each shape. Determine if the line drawn is a line of symmetry. Circle the shapes that show a line of symmetry.



For Problems 6–10, look at each shape. Draw one line of symmetry for each one. (Hint: One shape has more than one line of symmetry.)



Symbol Symmetry Look at each symbol. Some of the symbols are symmetrical, but some are not. Draw lines of symmetry in the symmetrical symbols. Some symbols may have more than one line of symmetry.

1. **B**

2. **G**

3. **A**

4. **W**

5. **Z**

6. **p**

7. **Y**

8. **V**

9. **!**

10. **{**

11. **d**

12. **b**

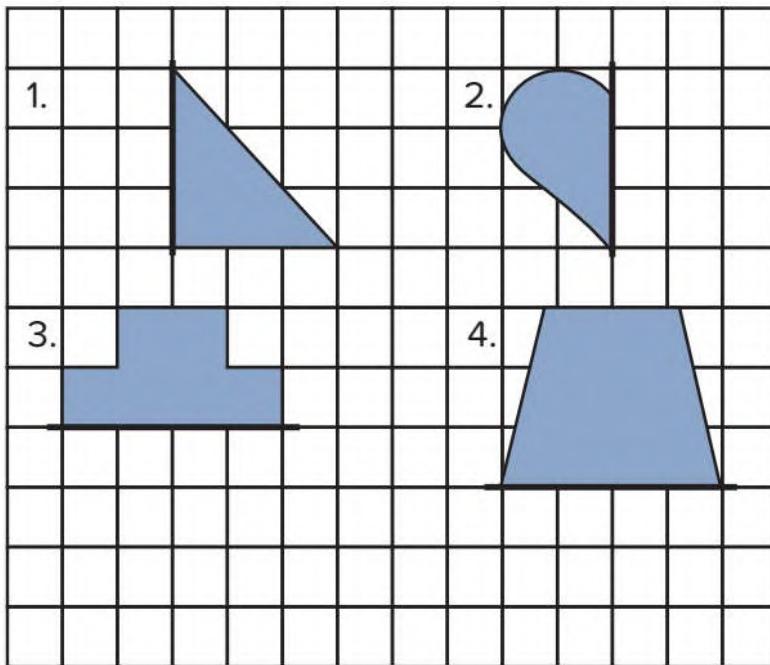
13. **“**

14. **X**

15. **%**

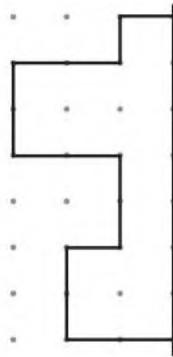
Lesson (6): Creating Symmetrical Images:

Creating Symmetrical Shapes In each picture, you can see half of the shape and the line of symmetry. Use that information to draw the rest of each shape.

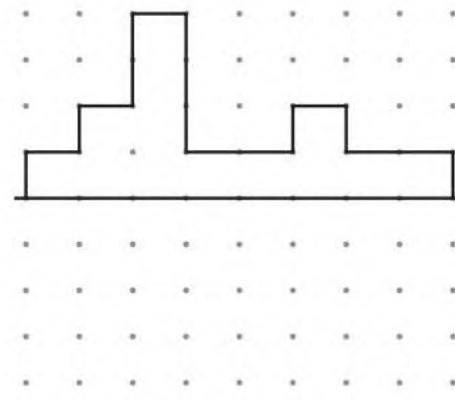


You are shown half of an image and the line of symmetry. Draw the rest of the image to complete the shape.

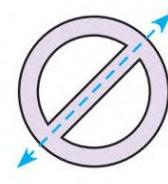
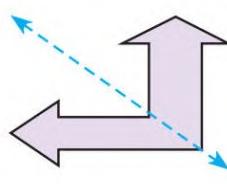
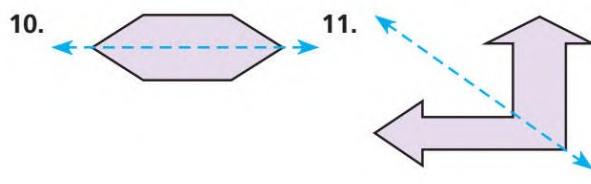
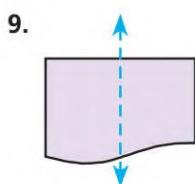
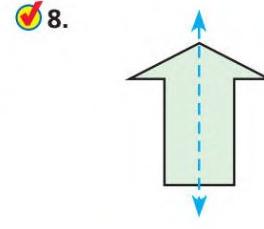
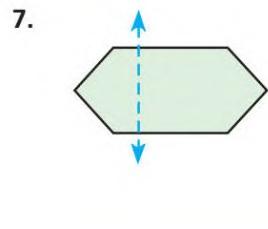
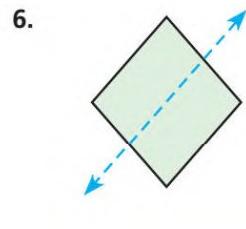
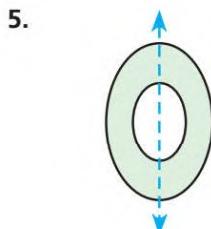
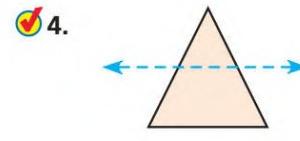
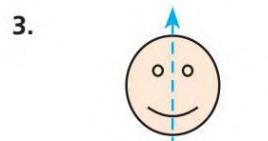
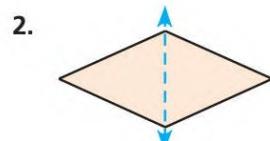
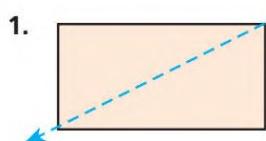
1.



2.



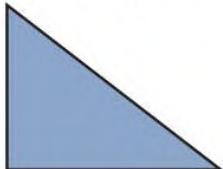
Tell whether the parts on each side of the line match. Is the line a line of symmetry? Write yes or no.



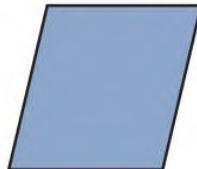
Lesson (7): Real-World Geometry, Part (1):

Which One Does Not Belong? Look at the shapes with a partner. Choose which one does not belong. Write down your explanation. (You do not have to agree with your partner.)

Shape 1



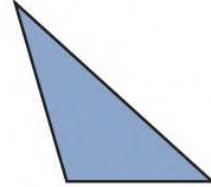
Shape 2

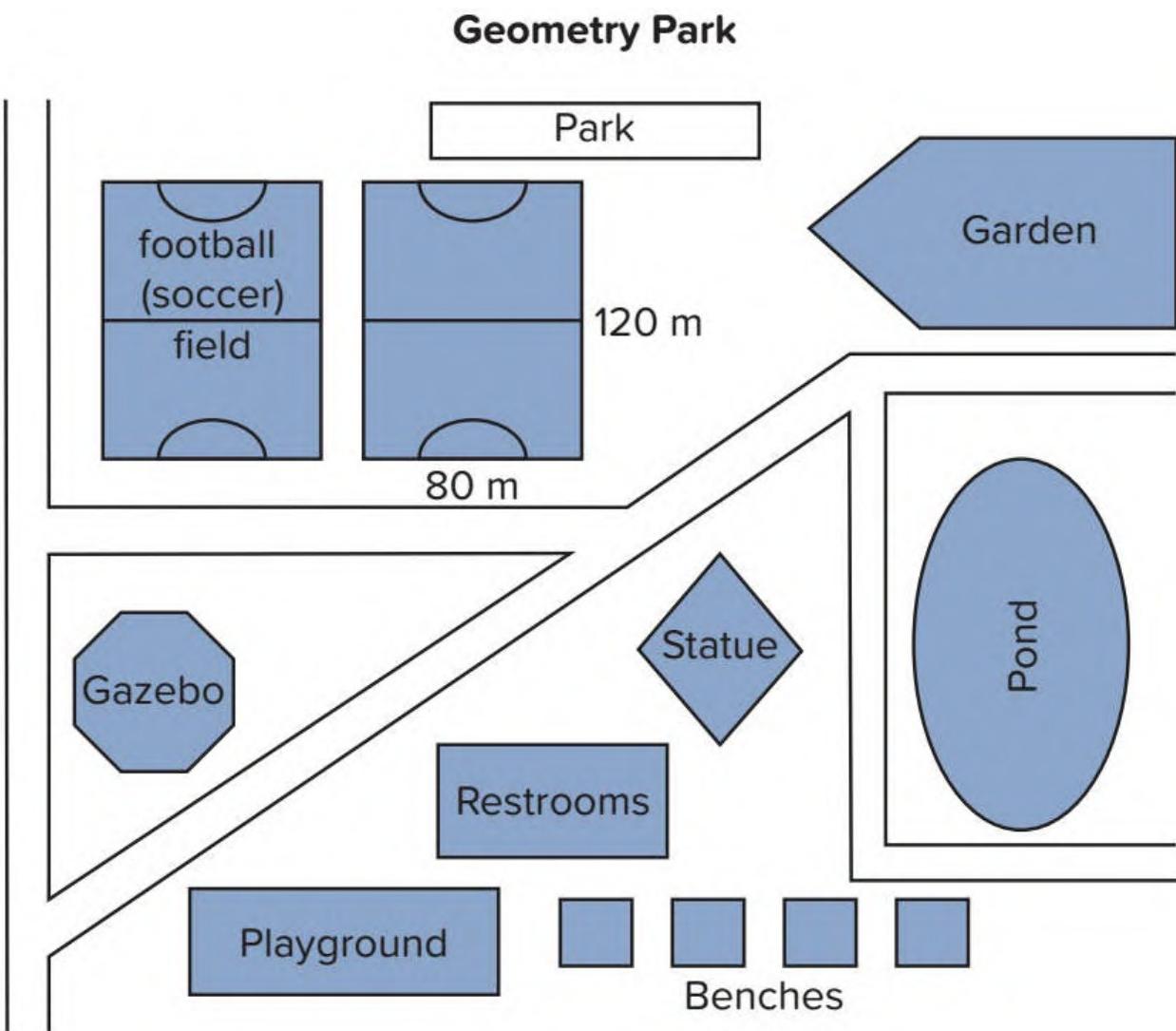


Shape 3



Shape 4





Geometry Park Look at the picture of the park on the following page, and then follow the directions.

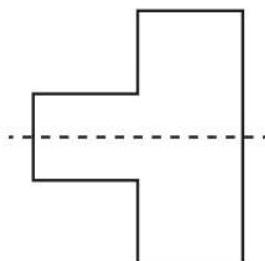
1. Color two perpendicular lines blue.
2. What shape are the restrooms?
3. Color two parallel lines green.
4. How many quadrilaterals are in the park?
5. Color two intersecting lines red.
6. Circle and label three different two-dimensional shapes.
7. Find the perimeter and area of one of the football pitches.
8. Draw at least one line of symmetry on the garden, the gazebo, and the statue.



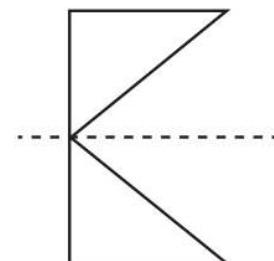
Homework

Circle the shapes that show a line of symmetry.

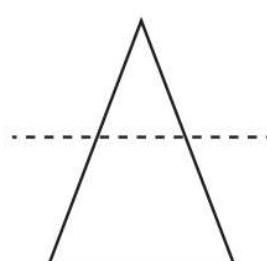
1.



2.

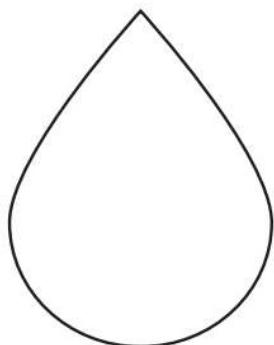


3.

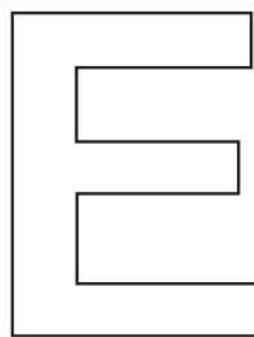


Draw a line of symmetry for each shape.

4.

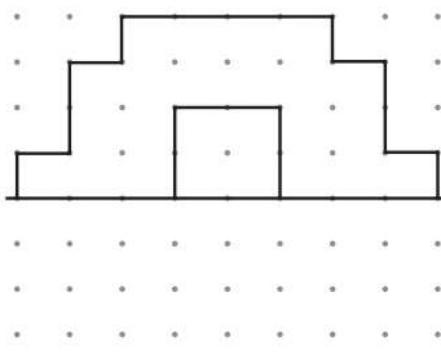


5.

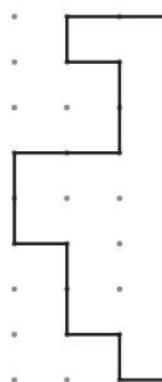


You are shown half of an image and the line of symmetry. Draw the rest of the image to complete the shape.

3.



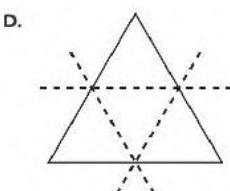
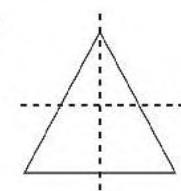
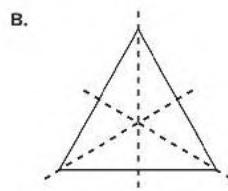
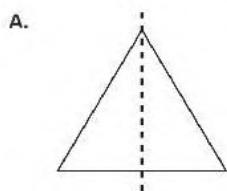
4.



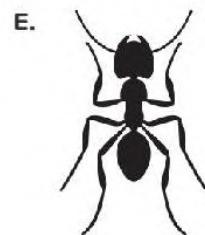
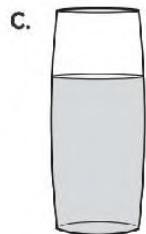
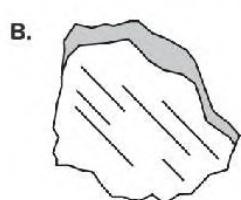
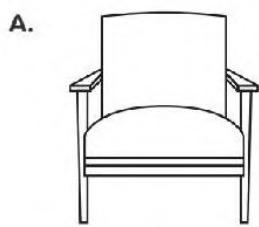
5. Is the flag of Egypt is symmetrical? Explain your thinking.



Select the answer choice that shows all the lines of symmetry in the figure.

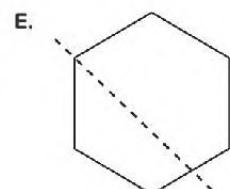
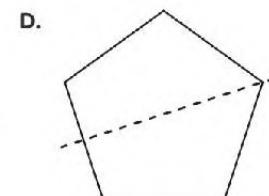
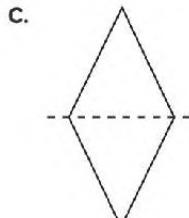
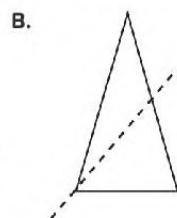
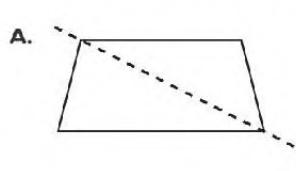


Which objects are symmetrical? Select *three* correct answers.

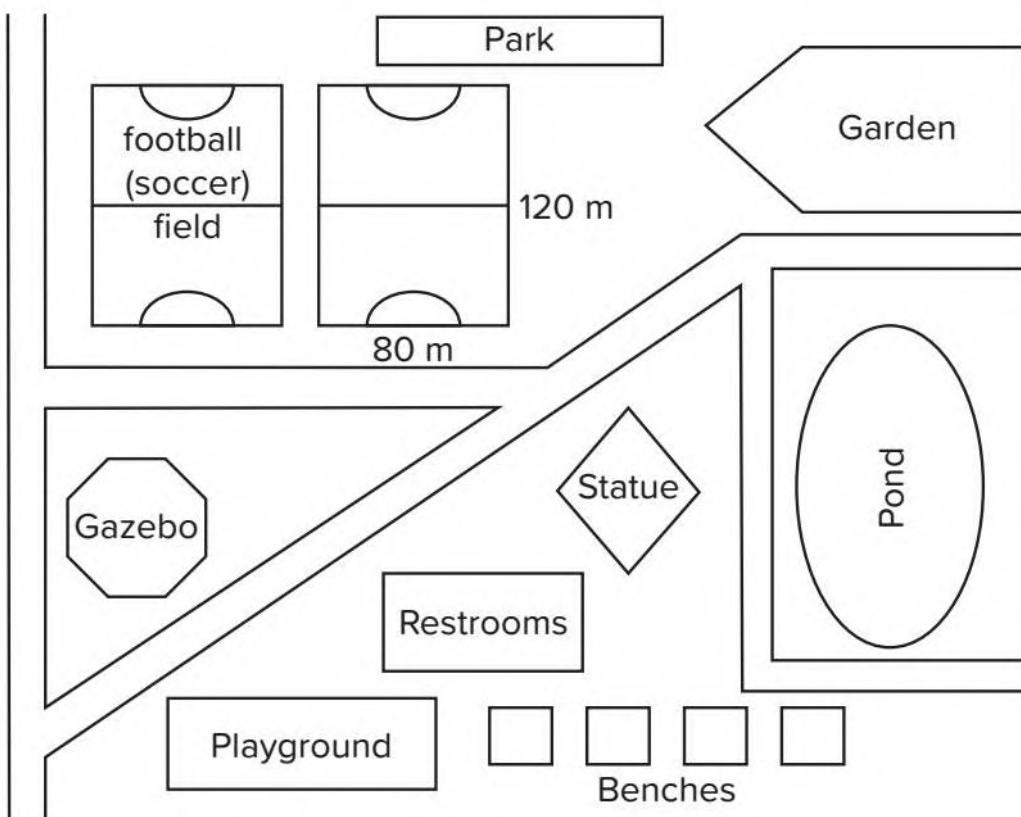


Which figures show a correct line of symmetry drawn?

Select *two* correct answers.



Use the picture of Geometry Park to answer the questions that follow.



1. The length of the playground is 18 meters and the width is 10 meters. What is the perimeter of the playground?

2. How would you describe the paths around the pond?

Circle all that apply:

parallel

intersecting

perpendicular

3. What is the shape of the gazebo?



Fill in the blanks below with the correct answer choice from each group.

Is this object symmetrical? Explain.

**A.**

- | |
|-----------------|
| symmetrical |
| not symmetrical |

B.

- | |
|------------|
| diagonal |
| vertical |
| horizontal |

C.

- | |
|---------------|
| match exactly |
| never overlap |

The fork is **A.** _____ because the figure can be folded along

a **B.** _____ line and the two pieces will

C. _____.



Concept (2)

Classifying Shapes in New Ways

Lesson (8): Identifying Right Angles:



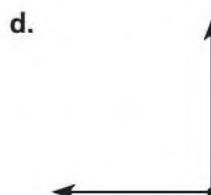
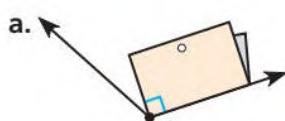
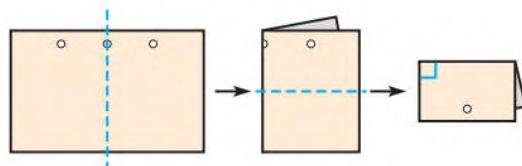
Activity: Classify an angle.

Materials ■ paper

To classify an angle, you can compare it to a right angle.

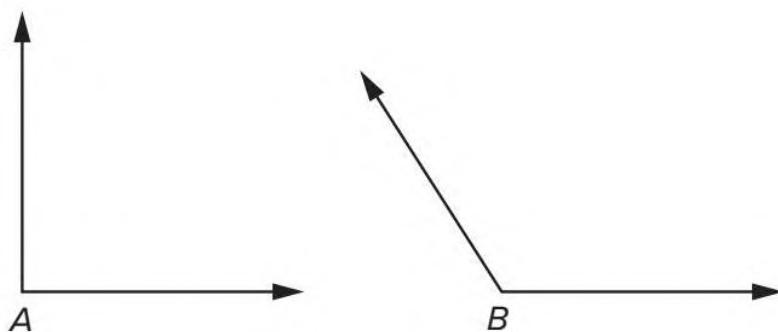
Make a right angle by using a sheet of paper. Fold the paper twice evenly to model a right angle. Use the right angle to classify the angles below.

Write *acute*, *obtuse*, *right*, or *straight*.



Fill in the blank below with the correct answer choice.

Angle A is a right angle. Is angle B greater than, equal to, or less than a right angle?



Angle B is _____ a right angle.

greater than

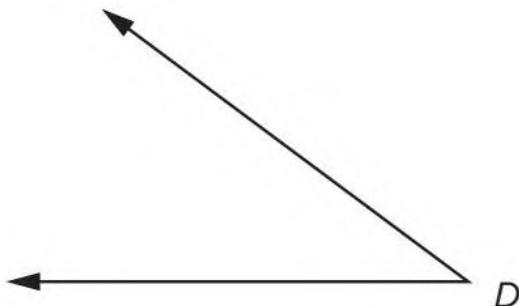
equal to

less than



Fill in the blank below with the correct answer choice.

What type of angle is angle D?

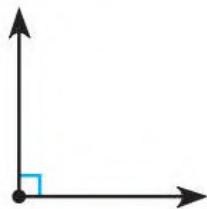


Angle D is a(an) _____ angle.

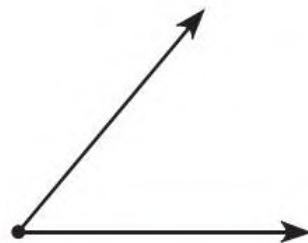
right	obtuse	acute
-------	--------	-------

Lesson (9): Classifying Angles:

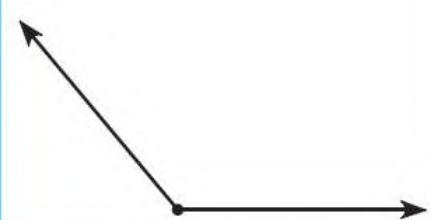
A **right angle** forms a square corner.



An **acute angle** is less than a right angle.

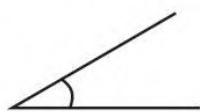


An **obtuse angle** is greater than a right angle and less than a straight angle.



Comparing Angles Look at the angles. Write whether each angle is larger than, smaller than, or equal to a right angle.

1.



2.



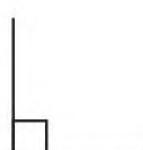
3.



4.



5.



6.





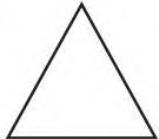
Lesson (10): Drawing Angles:

Types of Angles Color acute angles red, right angles yellow, and obtuse angles blue. Use your index card to prove what type of angle is shown. An example is shown.

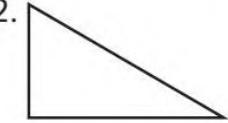
Example



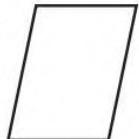
1.



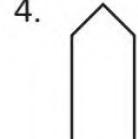
2.



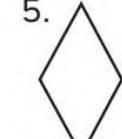
3.



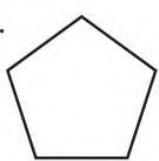
4.



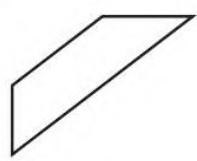
5.



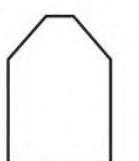
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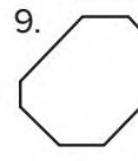
7.



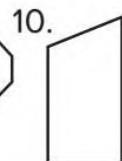
8.



9.

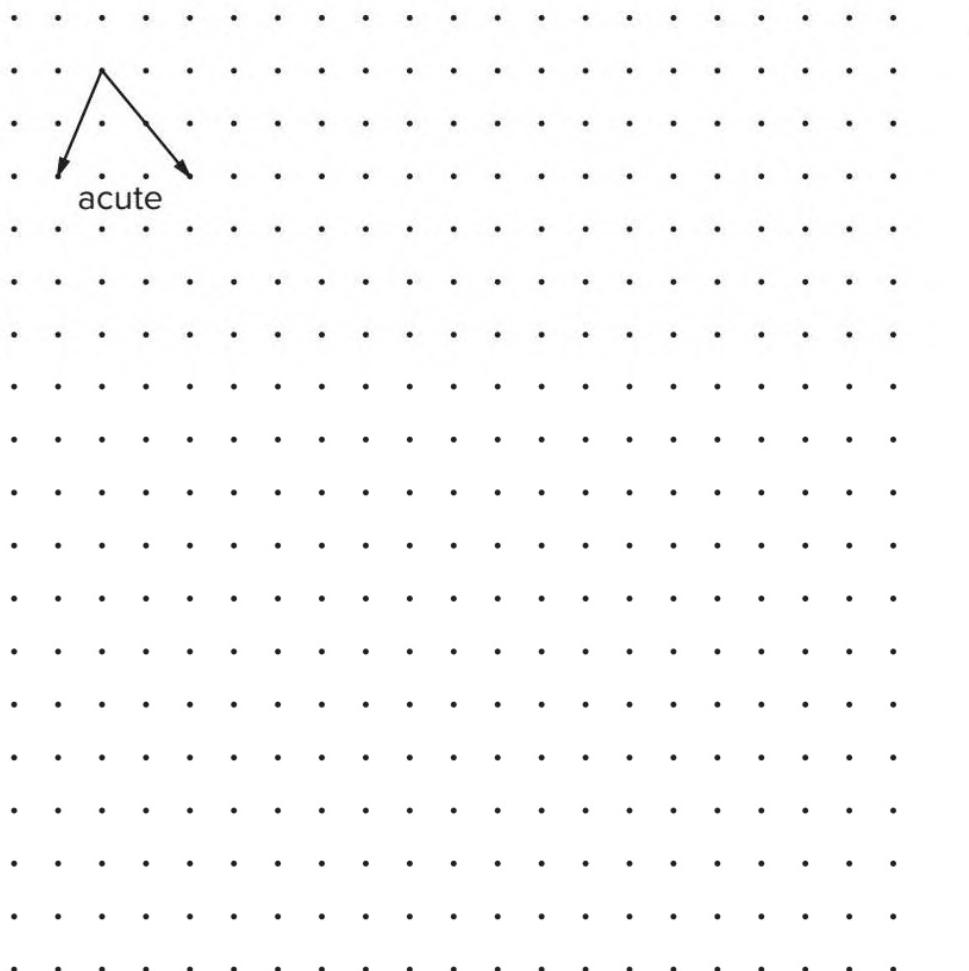


10.



Drawing Angles Use a ruler to connect the dots to draw and label the following in the grid.

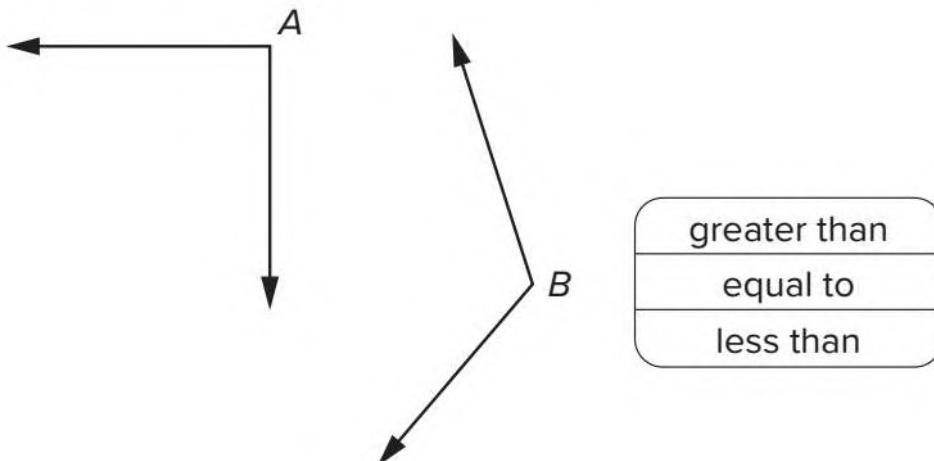
- 3 acute angles • 3 right angles • 3 obtuse angles
- A right angle and an obtuse angle that share an endpoint
- Two acute angles that share an endpoint



Homework

Fill in the blanks below with the correct answer choice from each group.

Angle A is a right angle. Is angle B greater than, equal to, or less than a right angle?

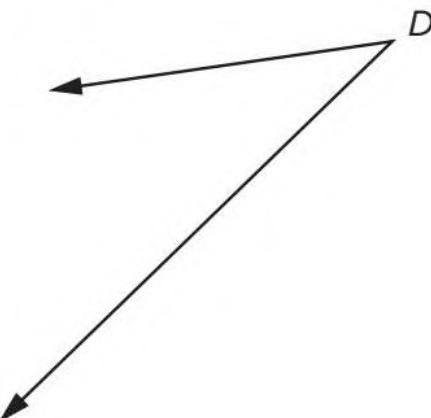


Angle B is _____ a right angle.

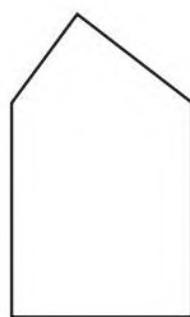
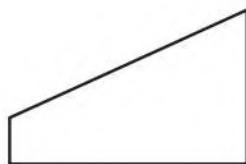
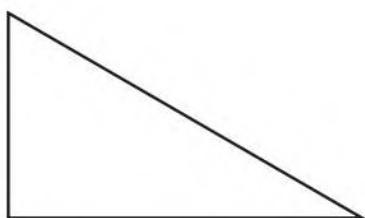
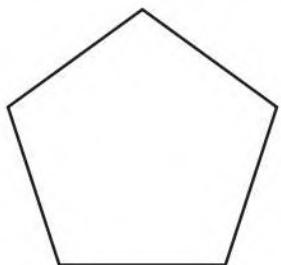


What type of angle is angle D?

- A. acute
- B. right
- C. obtuse
- D. straight



Circle the shapes that contain acute angles.



Shorouk planted a garden in the shape of a rectangle. How many right angles are in Shorouk's garden?



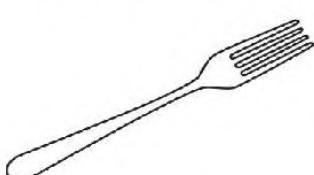
Draw a quadrilateral with at least two right angles. Label the angles.



Which object has a right angle?



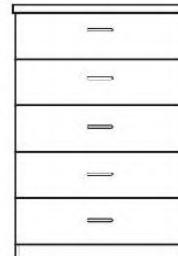
B.



C.

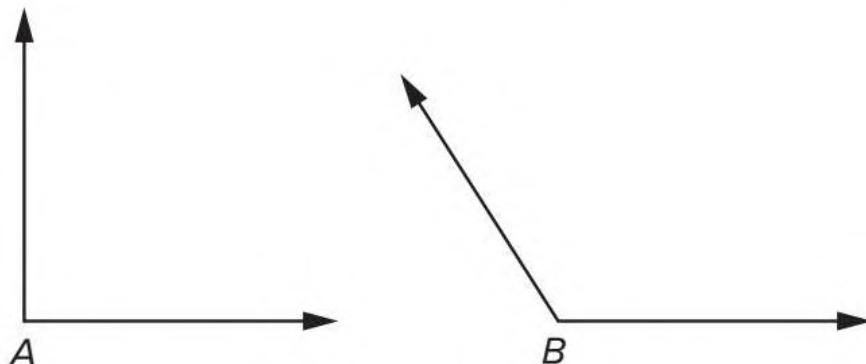


D.



Fill in the blank below with the correct answer choice.

Angle A is a right angle. Is angle B greater than, equal to, or less than a right angle?



Angle B is _____ a right angle.

greater than

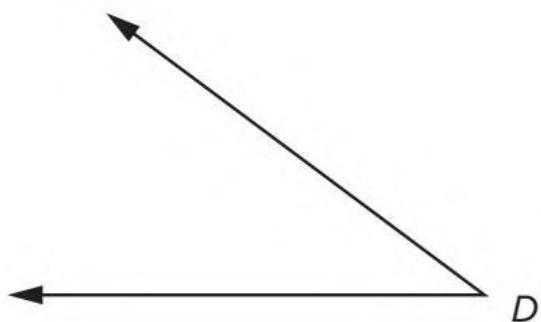
equal to

less than



Fill in the blank below with the correct answer choice.

What type of angle is angle D?



Angle D is a(an) _____ angle.

right

obtuse

acute



1. Draw and label \overline{AB} in the space at the right.

\overline{AB} is a _____.

Draw and label an example of the figure.

2. \overrightarrow{XY}

3. obtuse $\angle K$

4. right $\angle CDE$

Use Figure M for 5 and 6.

5. Name a line segment.

6. Name a right angle.

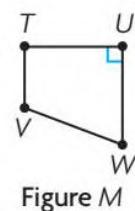


Figure M



Draw and label an example of the figure.

7. \overrightarrow{PQ}

8. acute $\angle RST$

9. straight $\angle WXZ$



Use Figure F for 10–15.

10. Name a ray.

11. Name an obtuse angle.

12. Name a line.

13. Name a line segment.

14. Name a right angle.

15. Name an acute angle.

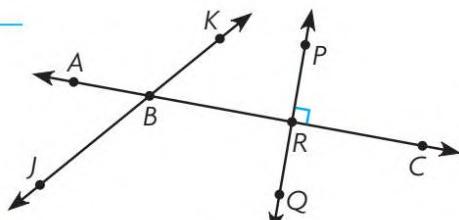
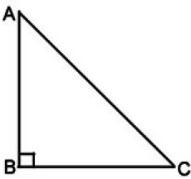
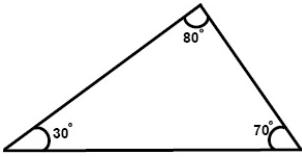
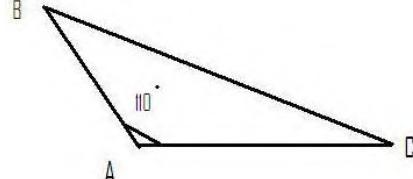


Figure F

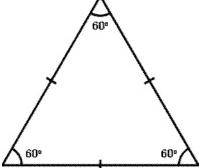
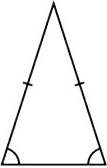
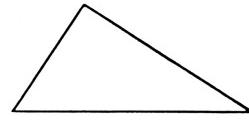


Lesson (11): Classifying Triangles:

Identifying the type of the triangle according to the measures of its angles

Right-angled triangle	Acute-angled triangle	Obtuse-angled triangle
		
<ul style="list-style-type: none"> It has only one right angle and two acute angles. 	<ul style="list-style-type: none"> It has three acute angles. 	<ul style="list-style-type: none"> It has only one obtuse angle and two acute angles.

Identifying the type of the triangle according to the length of its sides

Equilateral triangle	Isosceles triangle	Scalene triangle
		
<ul style="list-style-type: none"> The three sides are equal in length. 	<ul style="list-style-type: none"> Two sides only are equal in length. 	<ul style="list-style-type: none"> The three sides are different in length.

Note: The sum of the measures of the interior angles of any triangle = 180° .

Remarks

- (1) Any triangle has at least two acute angles.
- (2) We can't find two right angles in one triangle.
- (3) We can't find two obtuse angles in one triangle.



Triangle Challenge Work with a partner to use a ruler and your index card to draw the triangles described. Is it possible to draw them all?

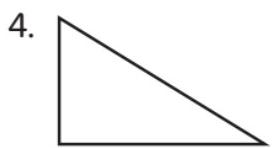
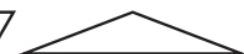
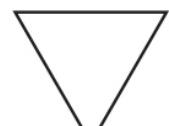
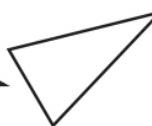
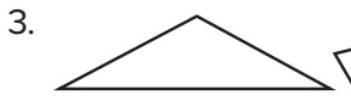
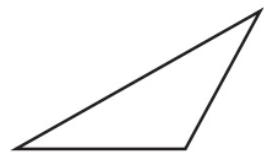
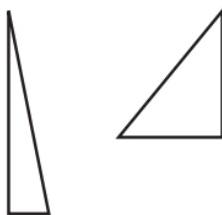
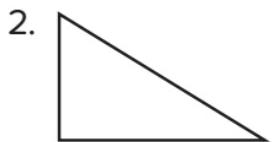
1. A triangle with three acute angles
2. A triangle with one right angle and two acute angles
3. A triangle with one obtuse angle and two acute angles
4. A triangle with two right angles and one acute angle



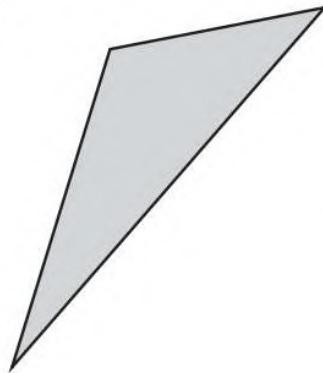
Odd One Out Look carefully at the sides and angles in each triangle. Circle the triangle that does not belong in each group. Use mathematical vocabulary to explain your reasoning.

1. Four triangles are shown: an equilateral triangle, an isosceles triangle, a scalene triangle, and a right-angled triangle.





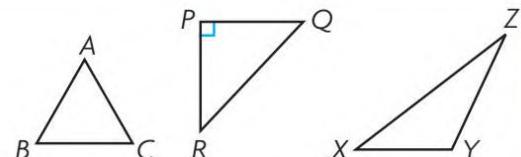
What type of triangle is shown?



- A. Right triangle
- B. Acute triangle
- C. Obtuse triangle
- D. Equiangular triangle

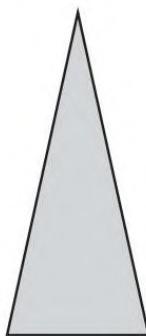


- a. Name the triangle with one right angle. _____
- b. Name the triangle with one obtuse angle. _____
- c. Name the triangle with three acute angles. _____



Fill in the blanks below with the correct answer choice from each group.

What type of triangle is shown? Explain how you know.



A.

- | |
|-------------|
| scalene |
| isosceles |
| equilateral |

B.

- | |
|---|
| 0 |
| 3 |
| 2 |

The triangle is A. _____ because it has

B. _____ sides that are the same length.



Lesson (12): Drawing Triangles:

Building Triangles Work with your partner to use straws to create the triangles. Draw your triangles in the space provided.

1. Build an equilateral triangle.

2. Build a triangle with all acute angles.

3. Build a triangle with an obtuse angle.

4. Build a scalene triangle.

5. Build a right triangle.

6. Build an isosceles triangle.

7. Build an isosceles triangle with a right angle.

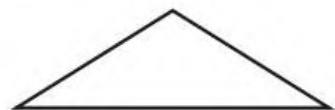
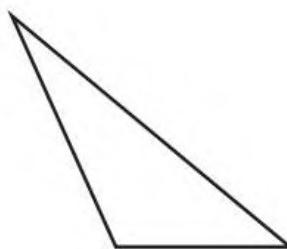
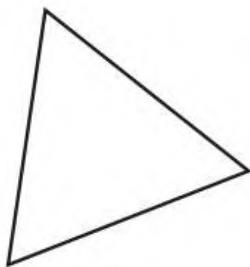
8. Build a scalene triangle with an obtuse angle.

Homework

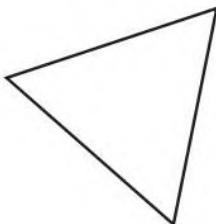
1. True or false: An isosceles triangle only has two sides that are the same length.



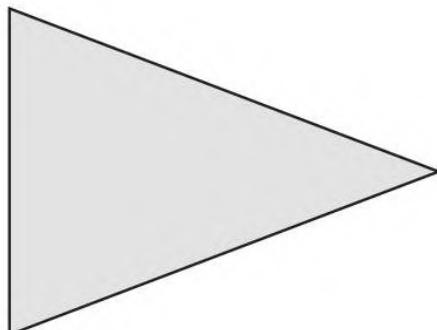
2. Circle the scalene triangle.



3. Is this an equilateral triangle? Why or why not?



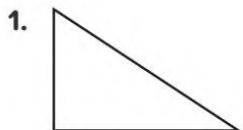
What type of triangle is shown?



- A. equilateral
- B. isosceles
- C. right
- D. scalene



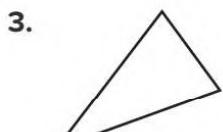
Match each triangle with its name.



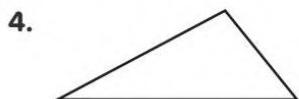
a. isosceles triangle



b. equilateral triangle



c. scalene triangle



d. right triangle

5. Draw an acute triangle. Circle any acute angles.

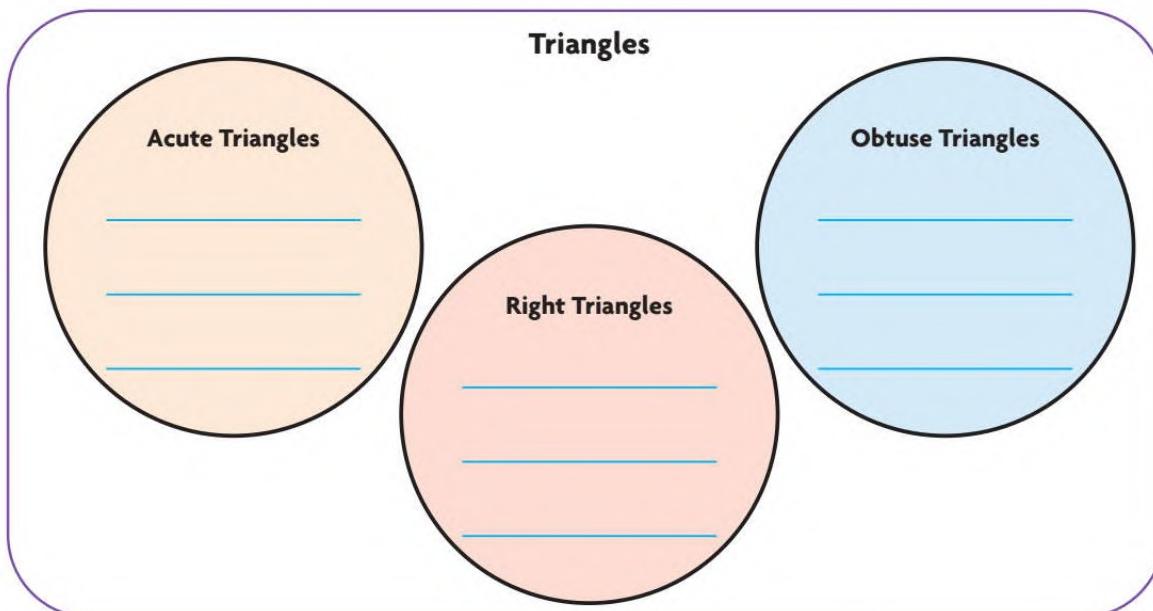
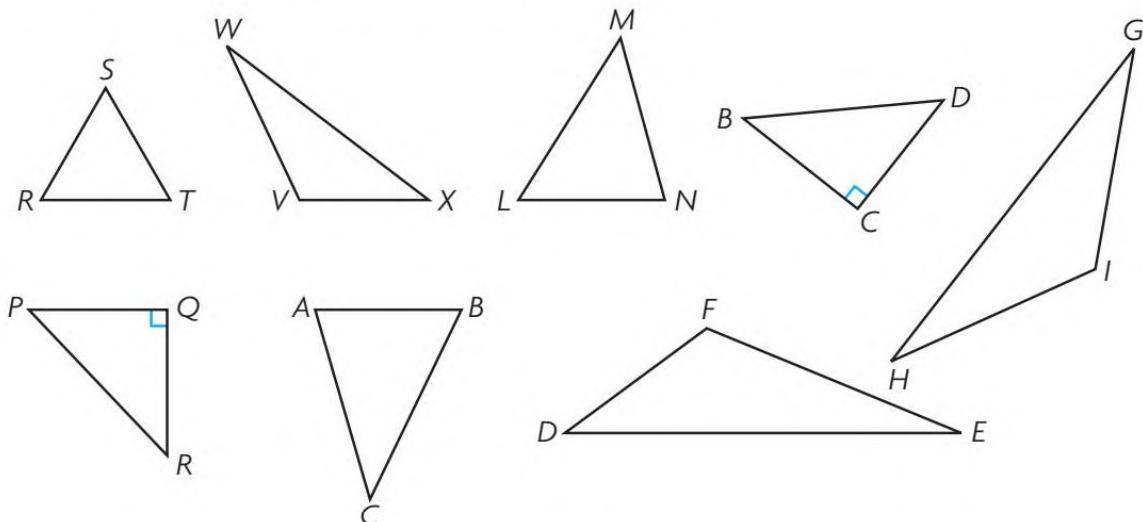
6. Draw an isosceles triangle with an obtuse angle. Circle any obtuse angles.

7. Draw a scalene triangle with an obtuse angle. Circle any obtuse angles.



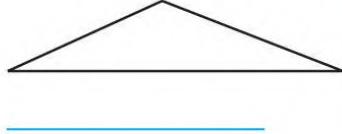
Use a Venn diagram to classify triangles.

Write the names of the triangles in the Venn diagram.

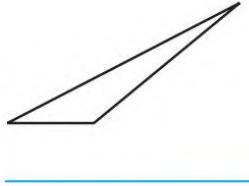


Classify each triangle. Write *acute*, *right*, or *obtuse*.

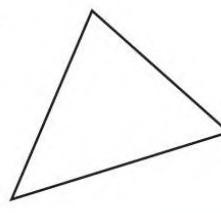
2.



3.

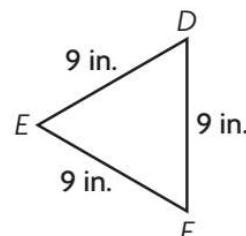
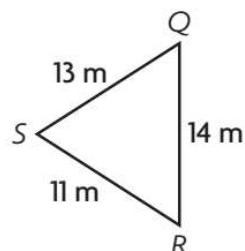
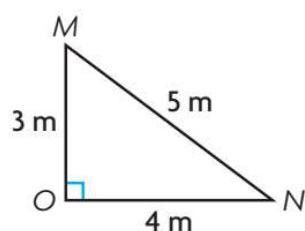
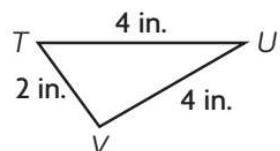
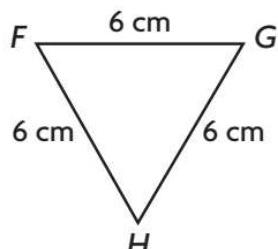
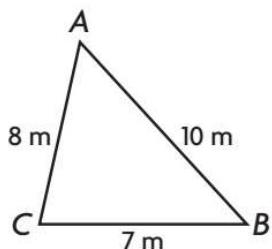


4.



Use a Venn diagram to classify triangles.

Write the names of the triangles in the Venn diagram



Triangles

Equilateral Triangles

Scalene Triangles

Isosceles Triangles



Classify each triangle. Write *acute*, *right*, or *obtuse*.

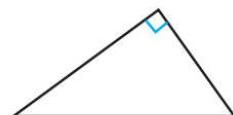
5.



6.



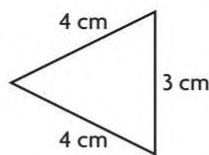
7.



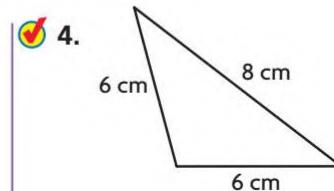
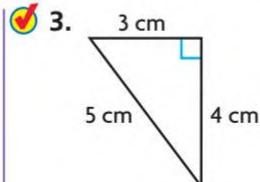
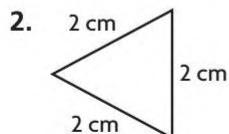
1. Name the triangle at the right.

Write *equilateral*, *isosceles*, or *scalene*.

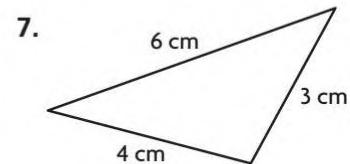
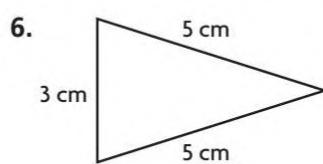
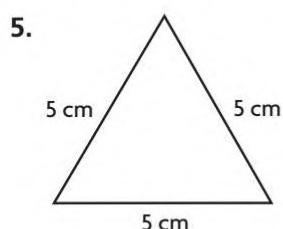
Think: How many equal sides does the triangle have?



Name the triangle. Write *equilateral*, *isosceles*, or *scalene*.

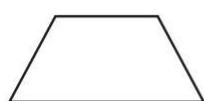


Name the triangle. Write *equilateral*, *isosceles*, or *scalene*.

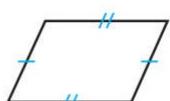


Lesson (13): Classifying Quadrilaterals:

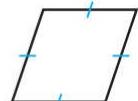
Common Quadrilaterals


Trapezoid

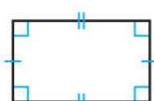
- 1 pair of parallel sides


Parallelogram

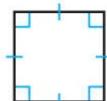
- 2 pairs of parallel sides
- 2 pairs of sides of equal length


Rhombus

- 2 pairs of parallel sides
- 4 sides of equal length


Rectangle

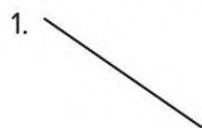
- 2 pairs of parallel sides
- 2 pairs of sides of equal length
- 4 right angles


Square

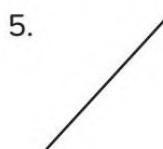
- 2 pairs of parallel sides
- 4 sides of equal length
- 4 right angles



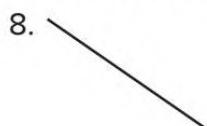
Draw lines to make pairs of parallel lines.



Draw lines to make pairs of intersecting lines.

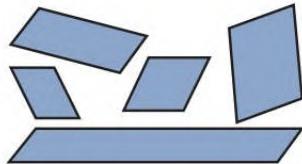


Draw lines to make pairs of perpendicular lines.



Naming Quadrilaterals Write the name of each quadrilateral. Count how many pairs of parallel sides the shape has and classify the angles. Draw at least one example of each quadrilateral using the dot grid.

1.



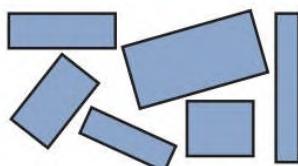
Name: _____

Parallel Sides: _____

Angles: _____



2.



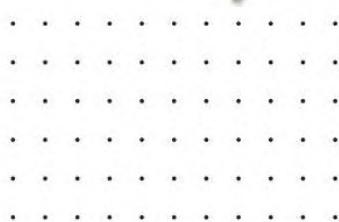
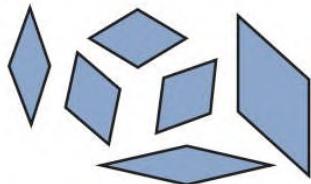
Name: _____

Parallel Sides: _____

Angles: _____



3.



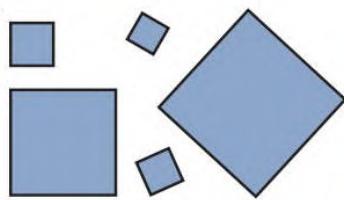
Name: _____

Parallel Sides: _____

Angles: _____



4.



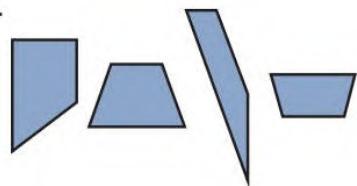
Name: _____

Parallel Sides: _____

Angles: _____



5.



Name: _____

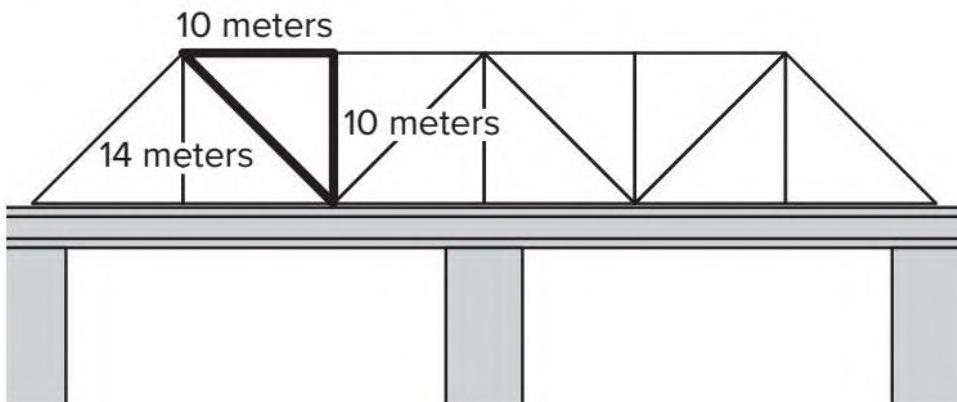
Parallel Sides: _____

Angles: _____



Lesson (13): Real-World Geometry, Part 2:

A bridge engineer is designing a new bridge. The beams of the bridge will be in the shape of isosceles right triangles. Which of these are true about the triangles on the bridge?



- A. The perimeter of each triangle is 24 meters.
- B. The three angles of each triangle are exactly the same.
- C. Each triangle has three lines of symmetry.
- D. Two sides of each triangle are the same.



1. What type of triangle is this sign?



Use the picture to answer the following questions.



2. Circle a parallelogram you see in the picture.
 3. Circle a triangle you see in the picture.
 4. Shade 3 rectangles you see in the picture.



Homework

1. What are three attributes of a square?
 2. Draw a quadrilateral with four equal sides and no right angles.
 3. Name the quadrilateral. Label each angle.
 4. Can you draw a quadrilateral with two pairs of parallel sides and only one right angle? Why or why not?



Seif drew a quadrilateral with two right angles, one acute angle, and one obtuse angle.

What is the *best* name for the quadrilateral Seif drew?

- A. parallelogram
- B. rectangle
- C. rhombus
- D. trapezium



Amany is moving into a new house. She has a rectangular rug that is 5 meters long and 2 meters wide. She needs to know information about the rug to decide where to place it. Which of these are true about Amany's rug? Select *three* correct answers.

- A. It has only three sides.
- B. It has four right angles.
- C. It has an area of 10 square meters.
- D. It has a perimeter of 7 meters.
- E. It has two pairs of parallel sides.
- F. It is also a square.



Mariam made a polygon using four same-sized pencils as its sides.

None of the pairs of pencils made a right angle.

Which term *best* describes the shape Mariam made?

- A. pentagon
- B. rhombus
- C. square
- D. trapezium





Unit 13

Angles of a Circle

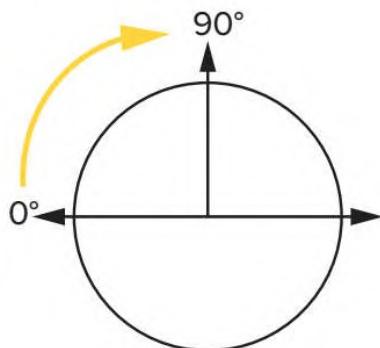
Concept (1)

Foundations of Angle Measurement

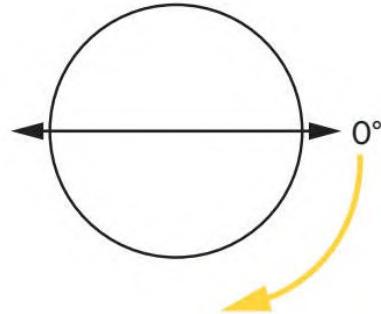
Lesson (1): Understanding Degrees:

Circles and Angles Move from 0° in the given direction and draw a right angle. Then, label 90° and 180° degrees on each circle. Compare your work with your Shoulder Partner's work.

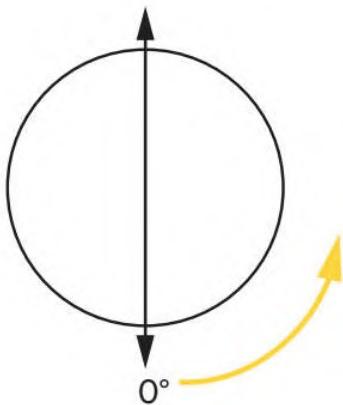
1. Label 180° .



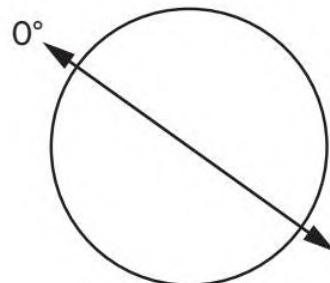
2. Move clockwise from 0° .



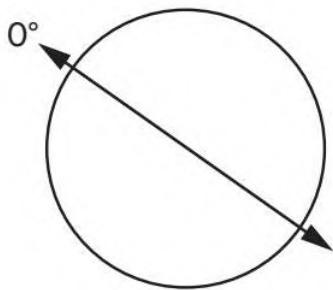
3. Move counterclockwise from 0° .



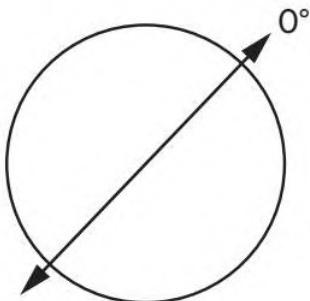
4. Move clockwise from 0° .



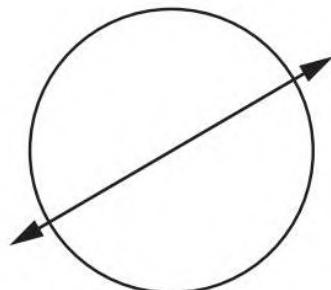
5. Move counterclockwise from 0° .



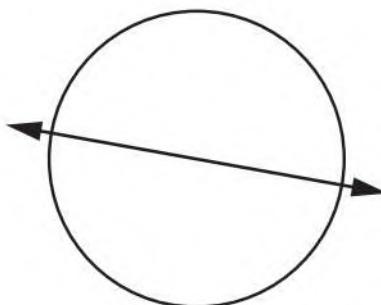
6. Move clockwise from 0° .



1. Draw an acute angle. An acute angle measures between _____ and _____ degrees.

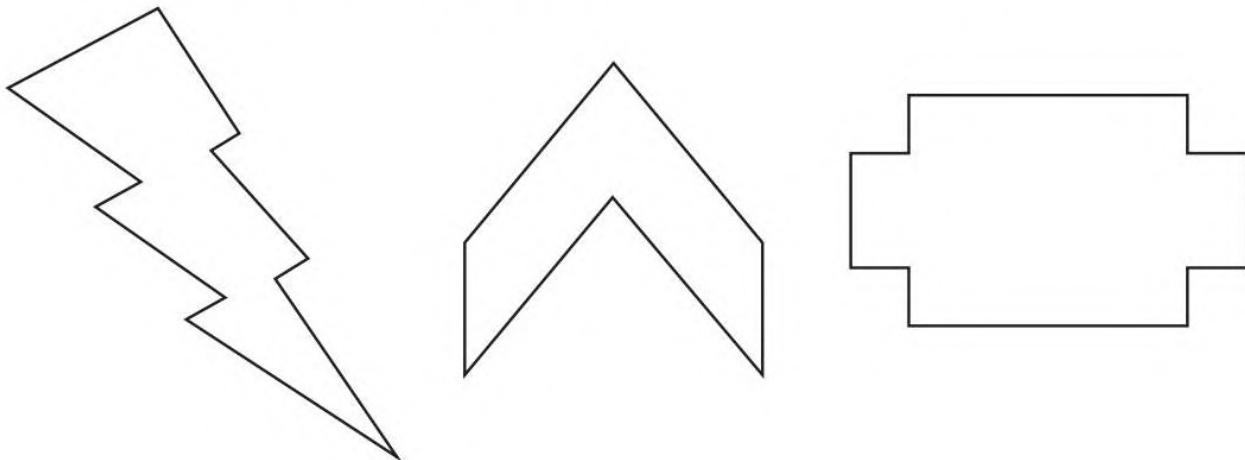


2. Draw an obtuse angle. An obtuse angle measures between _____ and _____ degrees.

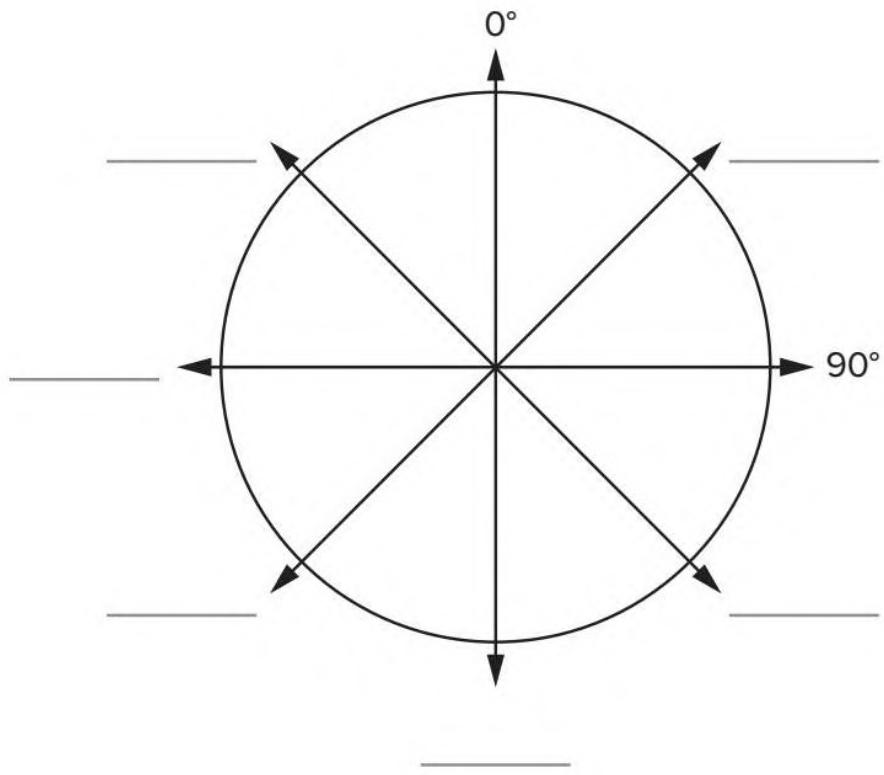


Lesson (2): Exploring Circle and Angle Relationship:

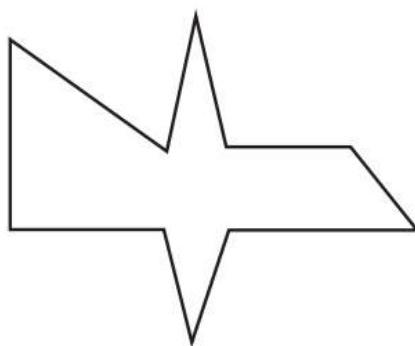
Types of Angles Circle the right angles. Mark an x on acute angles. Draw a star on obtuse angles. Can you classify them all?



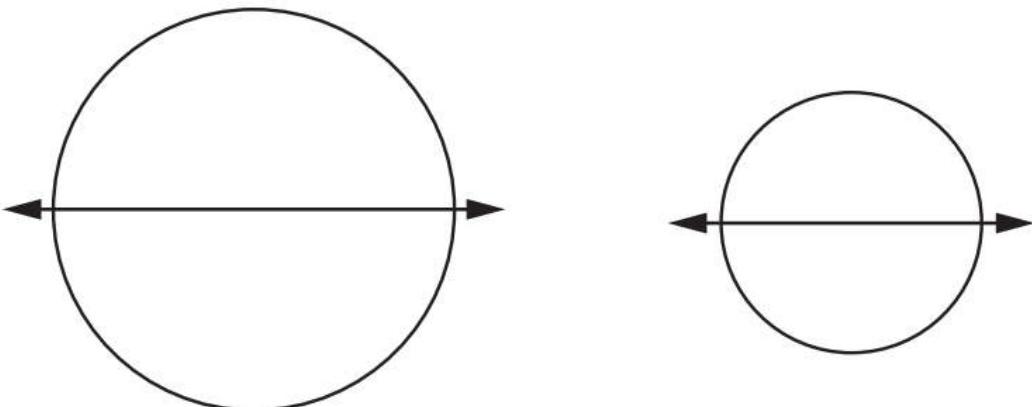
Benchmark Angles on a Circle Calculate and label the benchmark angles on the circle.



Classify and label the inside angles as acute, right, obtuse, or reflex.



Label 0° and 180° . Then, draw an angle that is about 270° in each circle and label it.



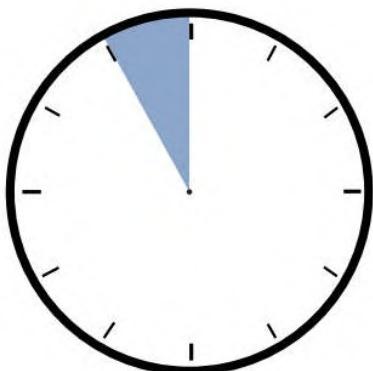
Lesson (3): Angles on a Clock Face:

Angle Reasoning Look at the angle shown. Is the angle closer to 135 or 225 degrees? How do you know? Explain your reasoning.

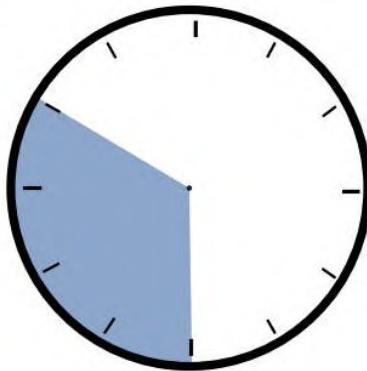


Fractions and Angles on a Clock Write the fraction of the clock shaded and how many degrees of the clock that fraction represents.

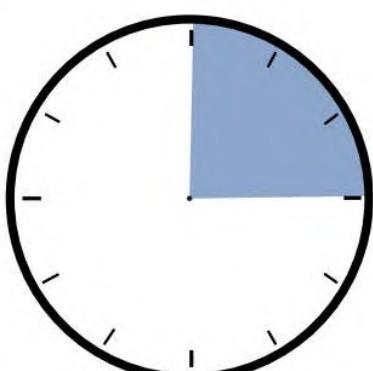
1.



2.

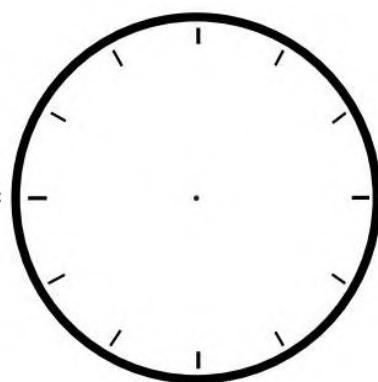


3.

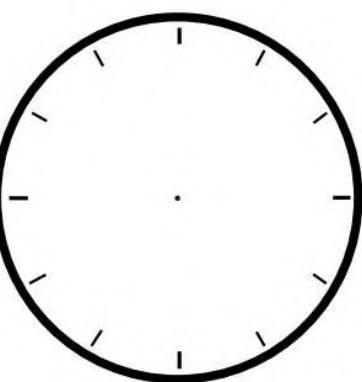


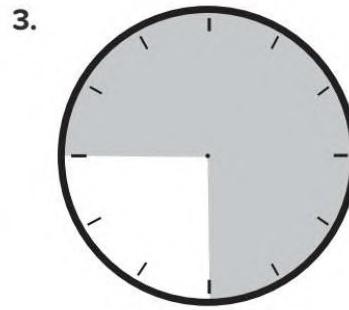
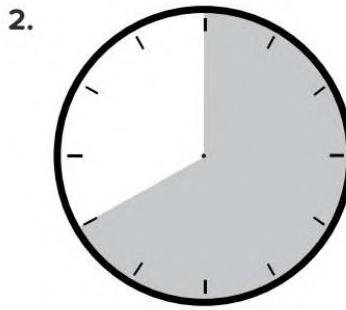
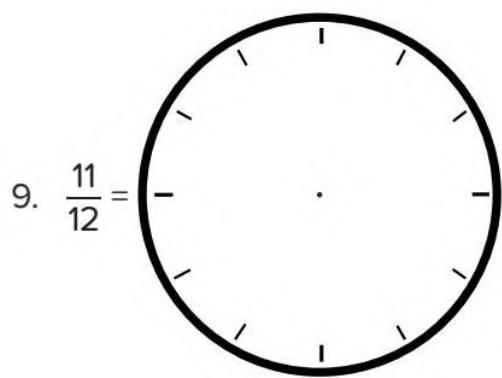
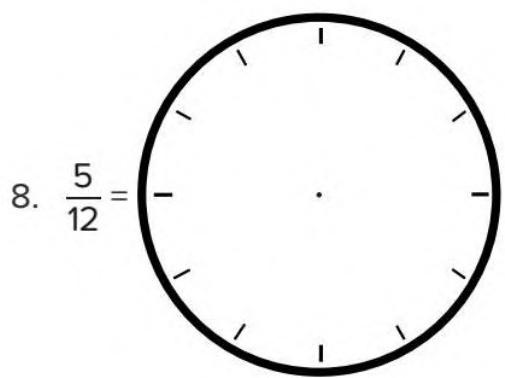
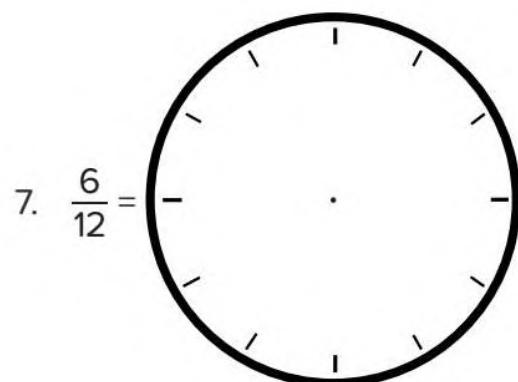
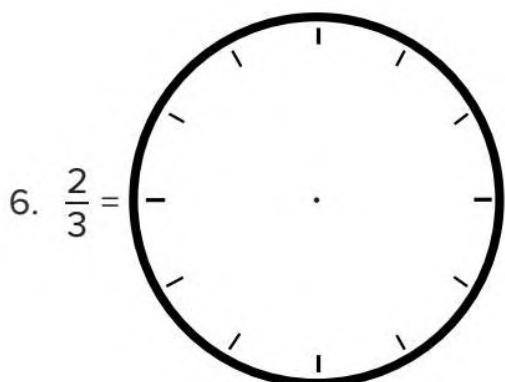
Use the blank clock faces and what you know about benchmark angles to write the missing angle measurements.

$$4. \frac{2}{12} =$$



$$5. \frac{3}{4} =$$





_____ = _____

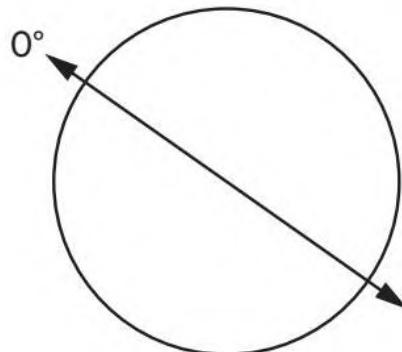
_____ = _____

Homework

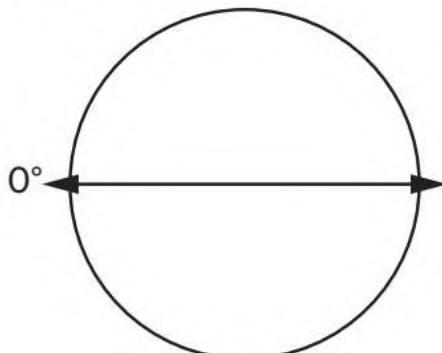
1. How many degrees are there in a straight angle?



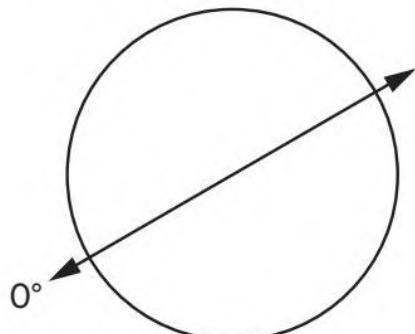
2. Label 180 degrees. Draw an obtuse angle moving clockwise from 0 degrees. Label the angle.



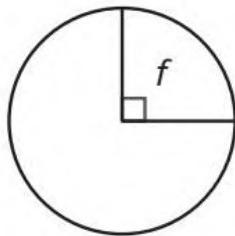
3. Label 180 degrees. Draw an acute angle moving counterclockwise from 0 degrees. Label the angle.



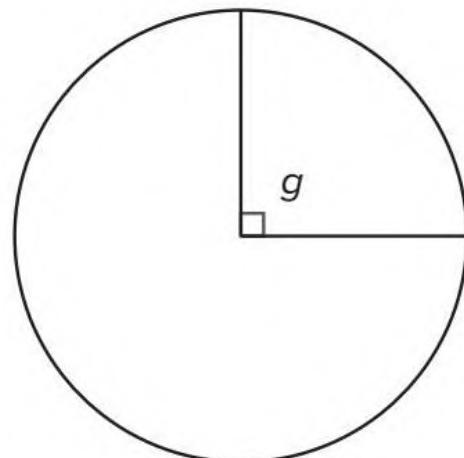
4. Label 180 degrees. Draw a right angle moving clockwise from 0 degrees. Label the angle.



Two circles are shown.



Circle F



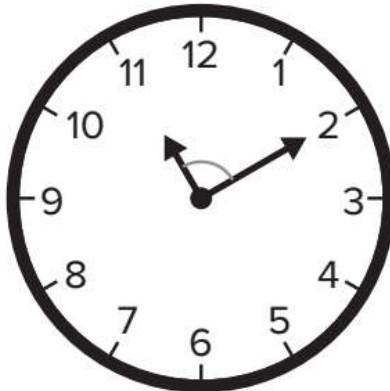
Circle G

Which statement *best* compares the measurements of the angle in circle G and the angle in circle F?

- A. The measurement of angle g in circle G is larger than the measurement of angle f in circle F because circle G is larger in size.
- B. The measurement of angle f in circle F is larger than the measurement of angle g in circle G because circle F is smaller in size.
- C. Angles g and f have the same measurement because all circles are 360° regardless of size.
- D. Angles g and f have the same measurement because all circles are the same size.



The analog clock reads 11:10. The clock's hands create an angle that represents $\frac{1}{4}$ of the clock.



Which two clocks show times that create the same angle?

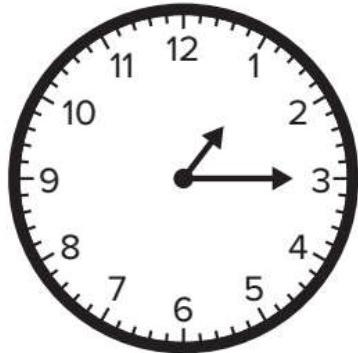
A.



B.



C.



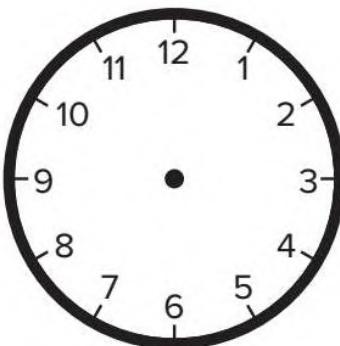
D.



E.



An analog clock is shown.



Which time would create an angle closest to 180°?

- A. 6:00
- B. 9:00
- C. 12:15
- D. 8:30



The hands of a clock form different angles. The hands form a 90° angle at 3:00. Which time would result in an angle greater than 90°?

- A. 3:05
- B. 3:15
- C. 3:30
- D. 3:45



An angle is formed by the hands of a clock.



Which is the best estimate of the angle created by the hands of the clock shown?

- A. 25° B. 33° C. 90° D. 120°

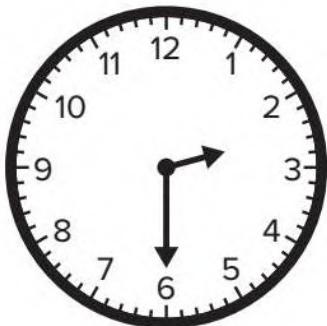


Asmaa estimated that the hands on a clock made an angle of approximately 60 degrees. Which option could be the time shown on the clock?

A.



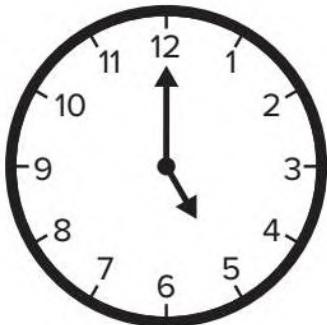
B.



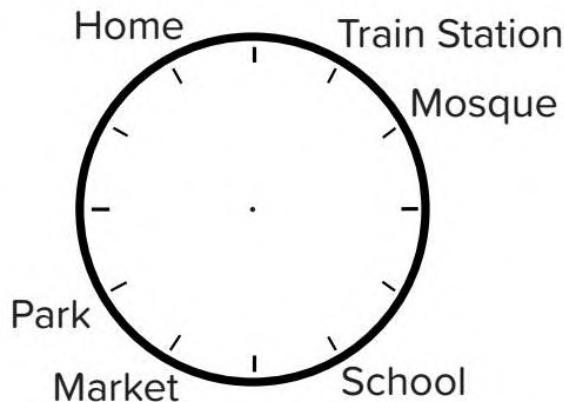
C.



D.



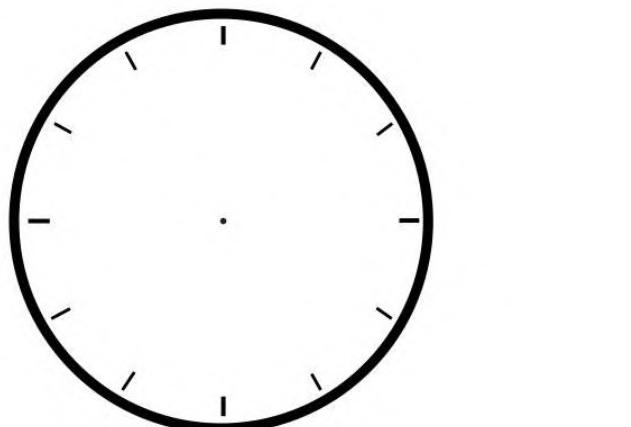
Traveling Around Town For each problem, imagine you are walking from one place, through the center of town, to the second place. Identify the angles traveled between the places in town. (Hint: Each section of the clock face measures 30 degrees.)



1. Home and school:
2. Park and school:
3. Market and home:
4. Mosque and train station:
5. Mosque and market:
6. School and market:



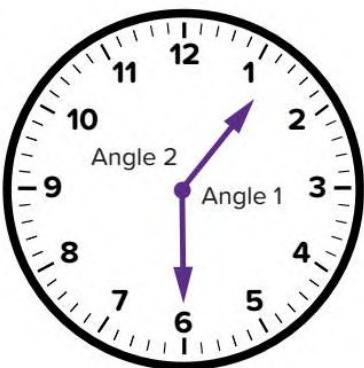
1. Label the angle measurements around the clock.



Lesson (4): Estimating Angles on a Clock:

Telling Time and Estimating Angles Write the time shown on each clock. Then, estimate the measurement of Angle 1 and Angle 2.

1.

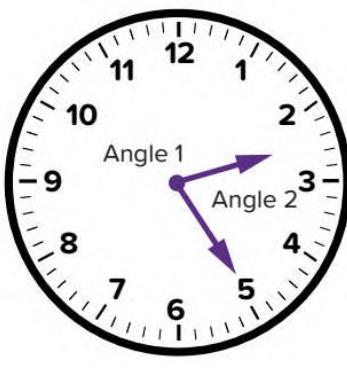


Time

Angle 1

Angle 2

2.

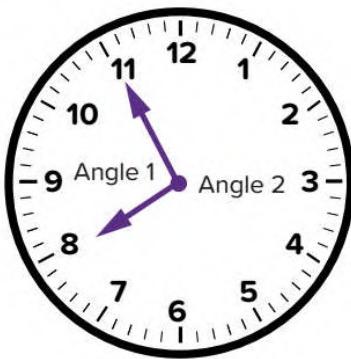


Time

Angle 1

Angle 2

3.

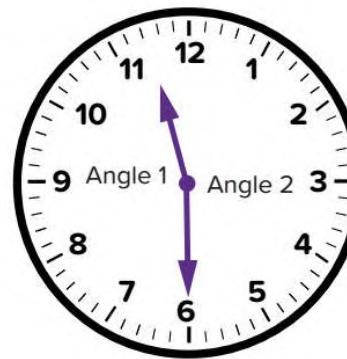


Time

Angle 1

Angle 2

4.

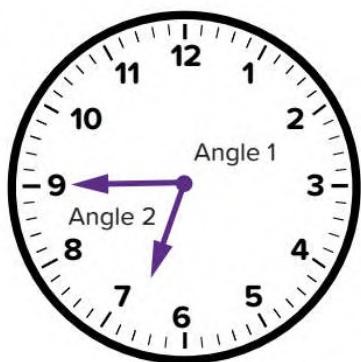


Time

Angle 1

Angle 2

5.

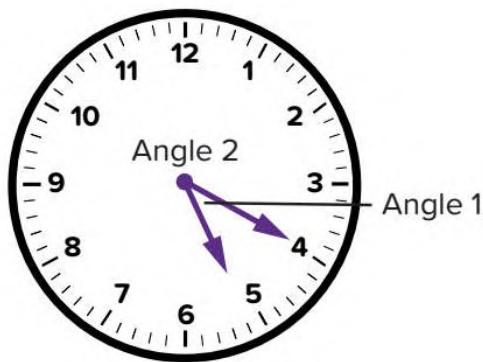


Time

Angle 1

Angle 2

6.



Time

Angle 1

Angle 2



Creating Angles on a Clock Write three different times when the hands on the clock create the angle given.

1. 180° 2. 30° 

Lesson (5): Using Paper Models to Measure and Draw Angles:

1. Which could be the measurement of an acute angle?

90 degrees

30 degrees

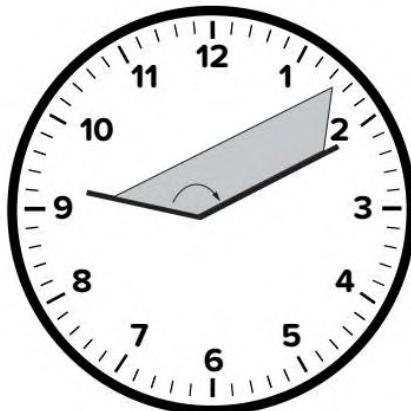
120 degrees



2. Estimate the measurement of the angle.



3. Estimate the measurement of the angle.

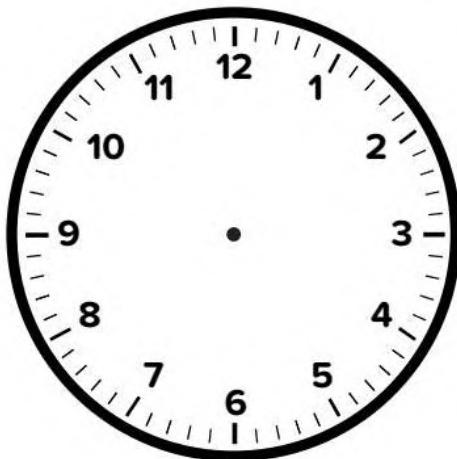


Homework

Estimate the measurement of the angle on this clock.



Draw the hands to show a time when the angle formed is about 60° .



Concept (2)

Measuring and Drawing Angles

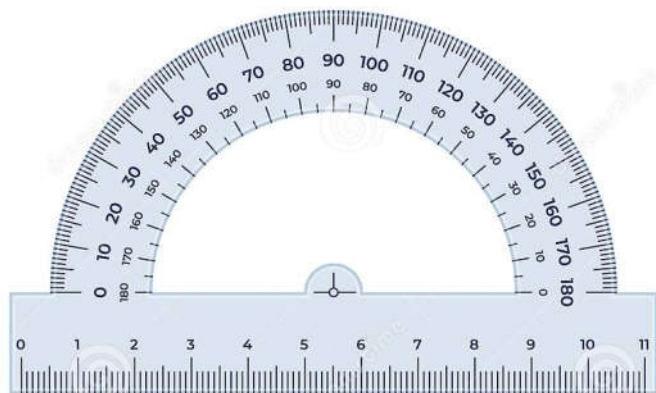
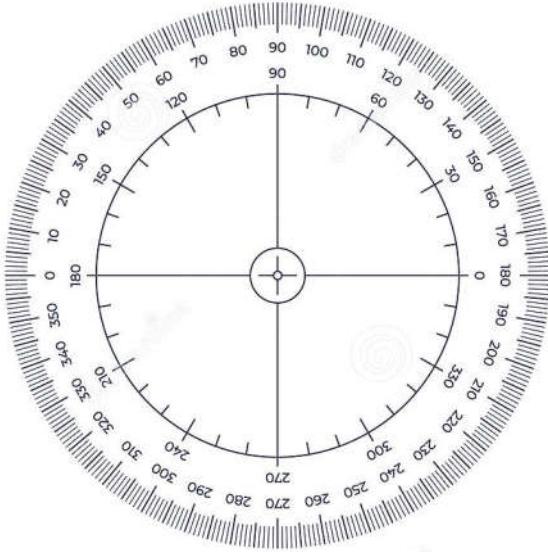
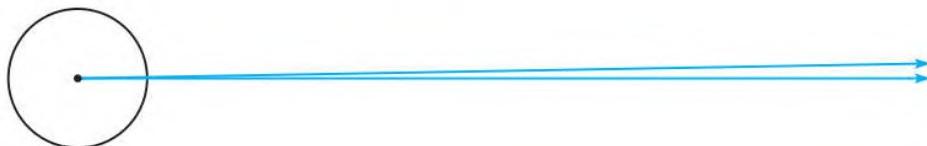
Lesson (6): Understanding Protractors:

Degrees

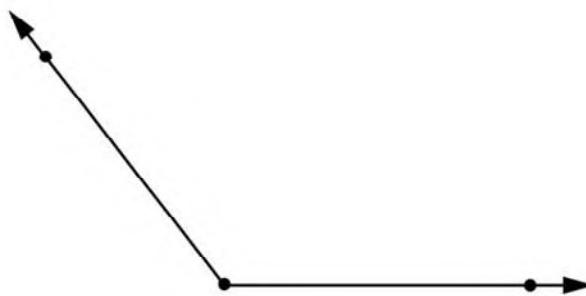
Essential Question How are degrees related to fractional parts of a circle?

CONNECT You can use what you know about angles and fractional parts of a circle to understand angle measurement. Angles are measured in units called **degrees**. Think of a circle divided into 360 equal parts. An angle that turns through $\frac{1}{360}$ of the circle measures 1 degree.

Math Idea
The symbol for degrees is °.



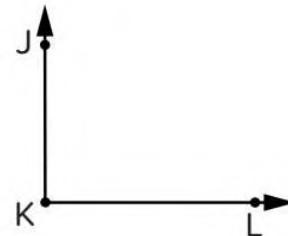
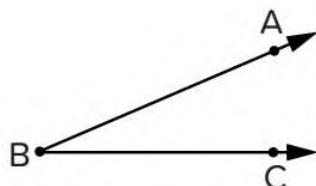
Write three different names for each angle.



Name 1 _____

Name 2 _____

Name 3 _____



Name 1 _____

Name 1 _____

Name 2 _____

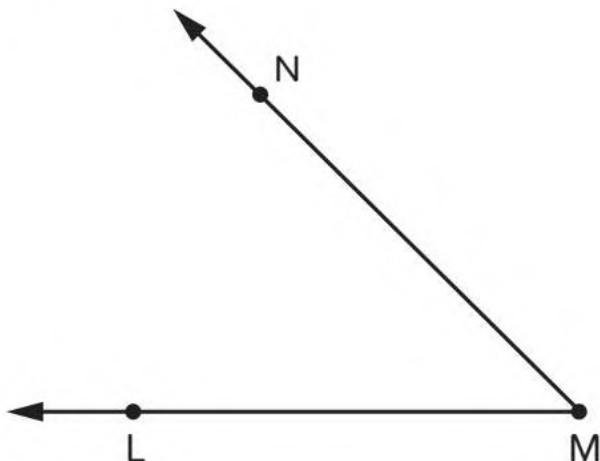
Name 2 _____

Name 3 _____

Name 3 _____



Fill in the blanks below with the correct answer choice from each group.
Consider the angle.

**A.**

LM
ML

B.

MN
NM

C.

L
M
N
LMN

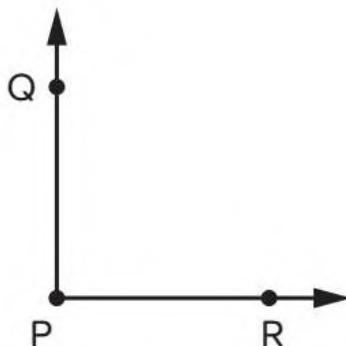
The angle is formed by ray **A.** _____ and ray **B.** _____.

The vertex of the angle is point **C.** _____.



Which *three* choices are acceptable names for the angle shown?

Consider the angle.



- | | | |
|-----------------|-----------------|---------------|
| A. $\angle PQR$ | C. $\angle RPQ$ | E. $\angle Q$ |
| B. $\angle QPR$ | D. $\angle P$ | F. $\angle R$ |



Lesson (7): Measuring Angles, Part (1):

Classifying Angles Classify each angle as acute, obtuse, right, or straight.

- | | | | | |
|----|----|----|----|-----|
| 1. | 2. | 3. | 4. | 5. |
| | | | | |
| 6. | 7. | 8. | 9. | 10. |
| | | | | |

Acute: , ,

Right: ,

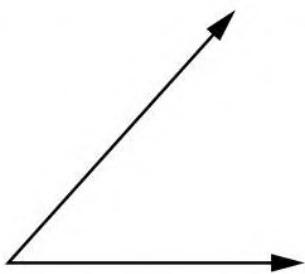
Obtuse: ,

Straight: , ,

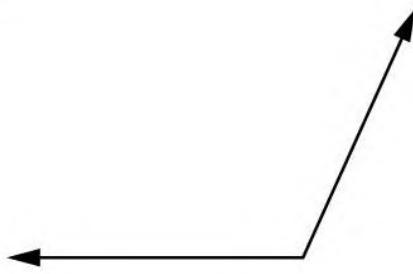


Measurement Practice

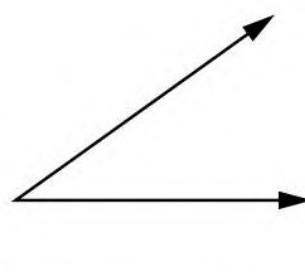
1.



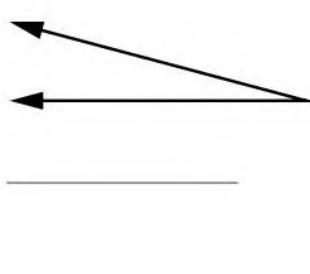
2.



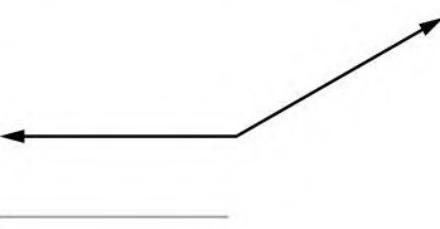
3.



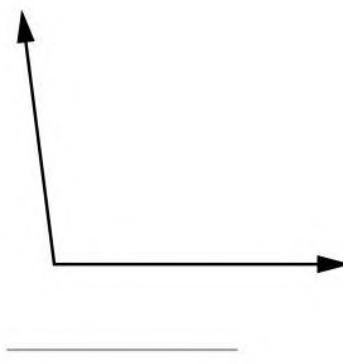
4.



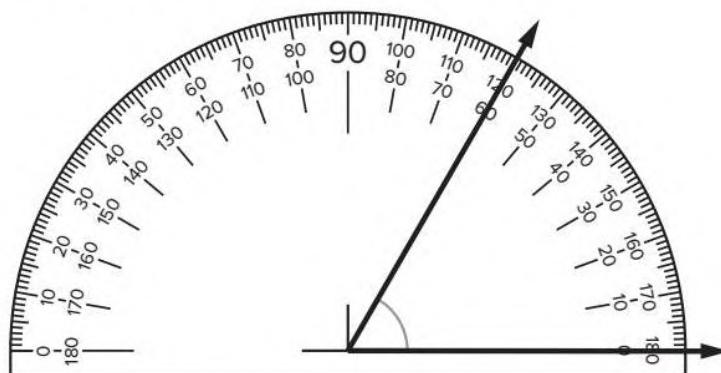
5.



6.



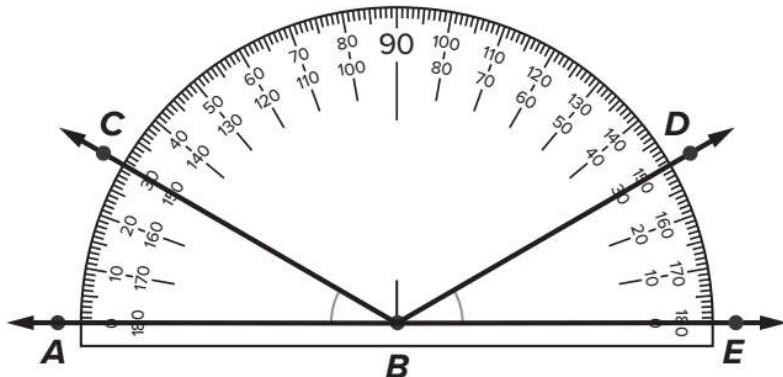
What is the measurement of this angle?



- A. 60° B. 90° C. 120° D. 180°



Ahmed drew angle ABC and angle DBE .

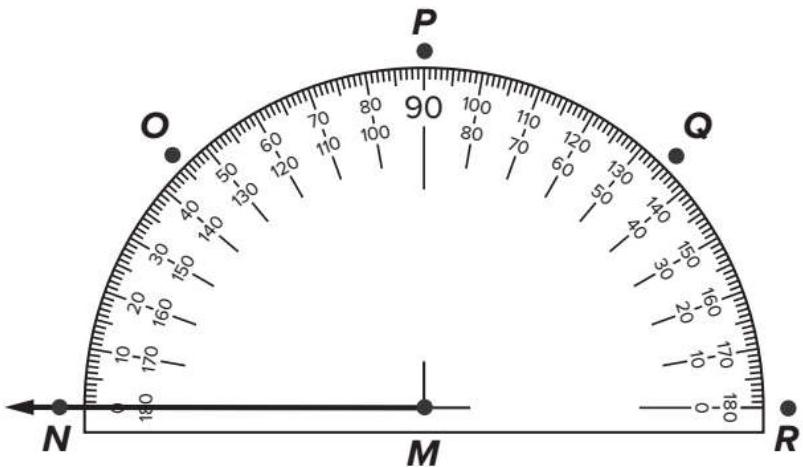


Which statement is true about the measurements of the angles Ahmed drew?

- A. The measurement of each angle is 30°.
- B. The measurement of each angle is 150°.
- C. The measurement of angle ABC is 30° and the measurement of angle DBE is 150°.
- D. The measurement of angle ABC is 150° and the measure of angle DBE is 30°.



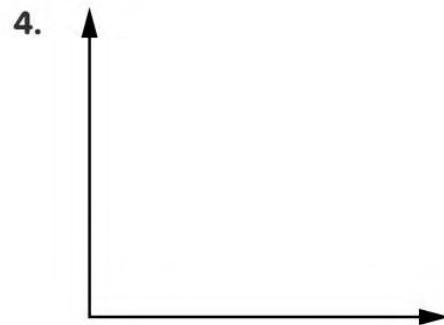
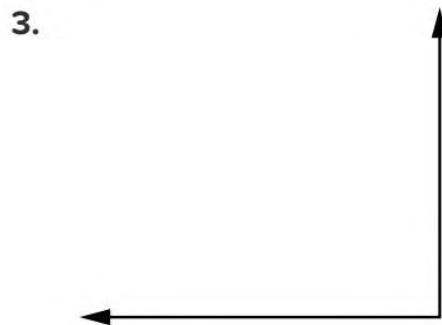
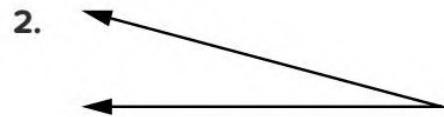
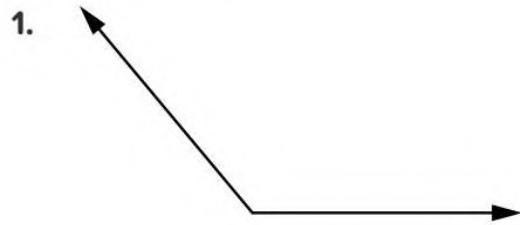
Sahar drew ray MN .



Which ray should Sahar draw next to form an angle that measures 90°?

- A. ray MO
- B. ray MP
- C. ray MQ
- D. ray MR

Classify each angle as acute, obtuse, or right. Then, use a protractor to find the angle measurement.

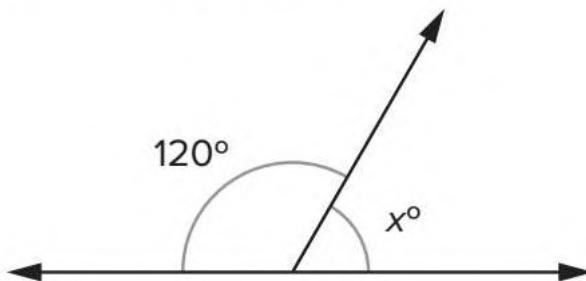


5. True or false: An acute angle can measure 80 degrees.



Lesson (8): Measuring Angles, Part (2):

A set of angles is shown in the figure.

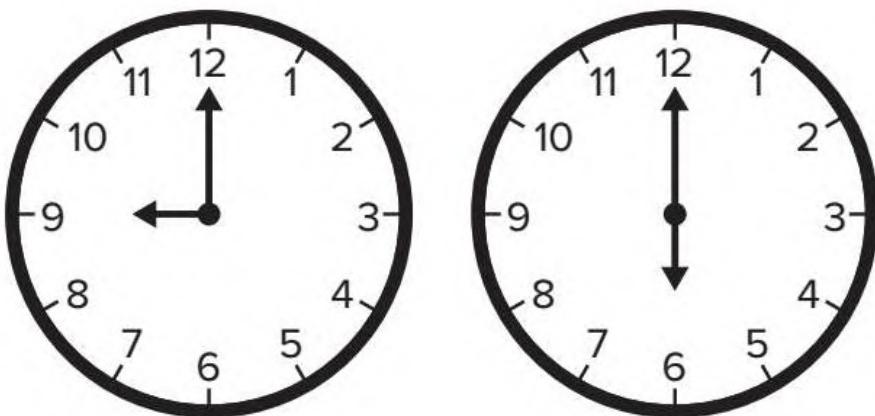


What is the value of x in the figure?

- A. 80 B. 120 C. 60 D. 300



Two clocks are shown.



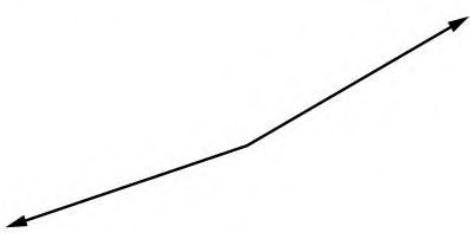
What is the difference in the angles formed by the hands on each clock?

- A. 30° B. 90° C. 270° D. 110°



Use a protractor to measure each angle. Record the measurement on the inside of the angle.

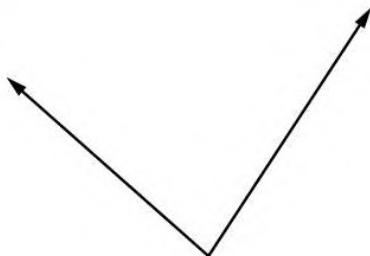
1.



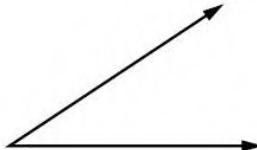
2.



3.



4.



Lesson (9): Drawing Angles:

Draw an estimate of the angle.

1. 140°

2. 12°

Use a protractor to draw each angle.

3. 65°

4. 125°

5. 50°



Drawing Angles with a Protractor Use your protractor to draw an angle with the given measurement.

1. 55°

2. 30°

3. 90°

4. 145°

5. 110°

6. 165°

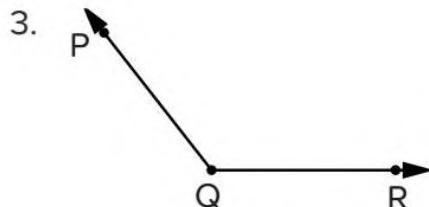
7. 100°

8. 70°



Homework

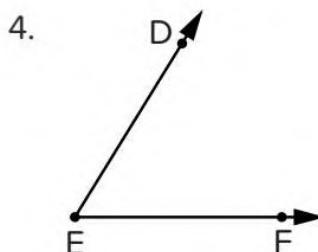
Write three different names for each angle.



Name 1 _____

Name 2 _____

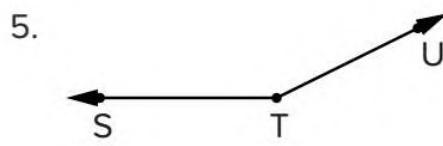
Name 3 _____



Name 1 _____

Name 2 _____

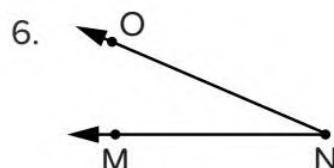
Name 3 _____



Name 1 _____

Name 2 _____

Name 3 _____



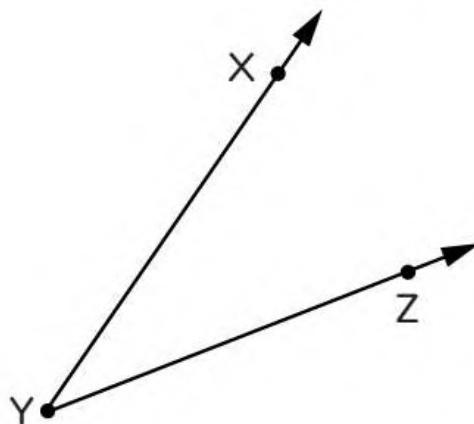
Name 1 _____

Name 2 _____

Name 3 _____



Name the rays and the vertex of the angle.

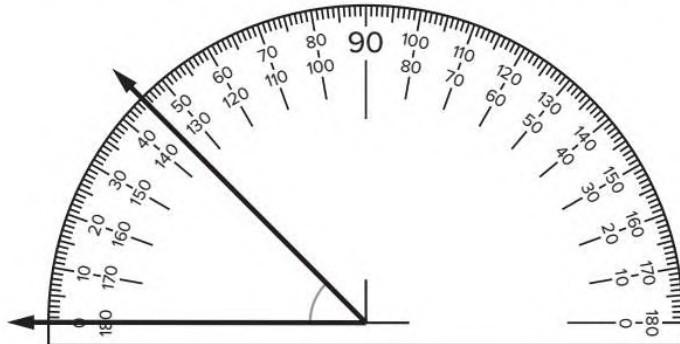


Name the angle in Problem 1 in three different ways.

Explain why a protractor has two sets of numbers (scales).



Fill in the blanks below with the correct answer choice from each group.

**A.**

- compass
- protractor
- ruler
- straightedge

B.

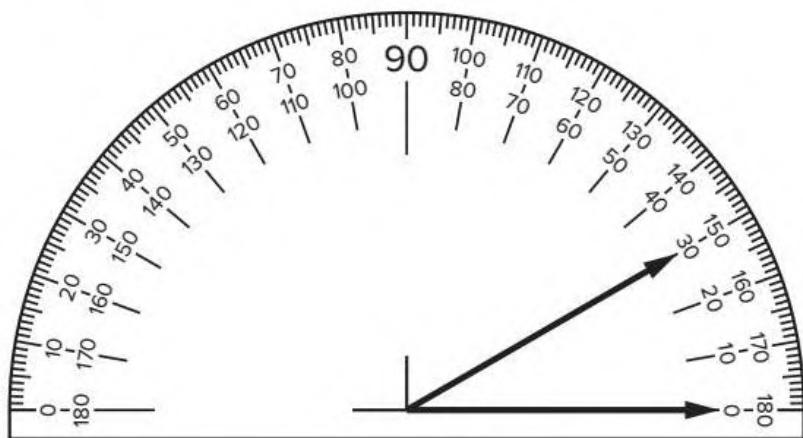
- 45°
- 55°
- 135°
- 145°

The tool used to measure angles is called a **A.** _____.

The measurement of the angle shown is **B.** _____.



An angle is shown on the protractor.



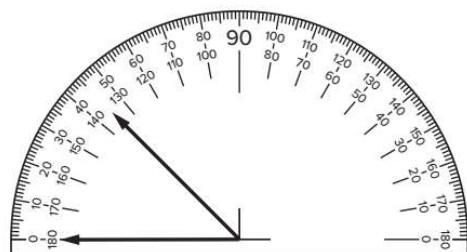
What is the measurement of the angle shown?

- A.** 180°
- B.** 30°
- C.** 90°
- D.** 150°

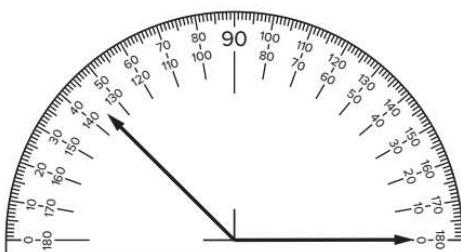


Which two choices show angles of 45° ?

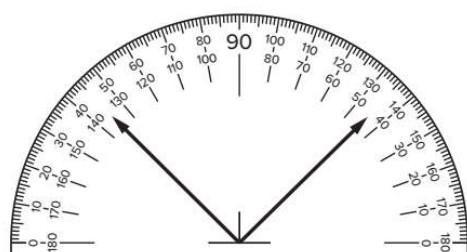
A.



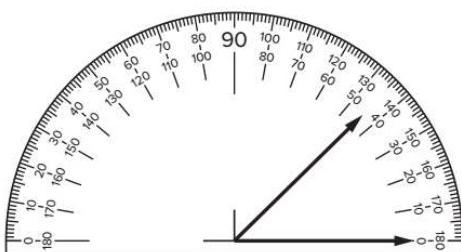
B.



C.



D.



- . Amal makes round cookies. Each cookie is dipped equally in two different colors of icing, black and white, to cover the cookie. What is the angle measurement of the portion of the cookie that is covered in white icing?

A. 45° B. 90° C. 180° D. 360° 

- Mr. Mohamed's restaurant sells slices of a circular tart. Each slice has sides that form a 30° angle. How many slices does it take to make one full circular tart?



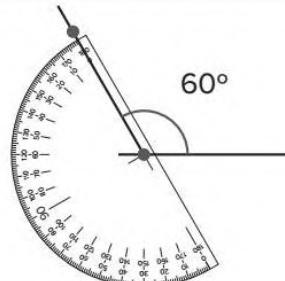
Circle the angle that measures 130° .



Basem used a protractor to draw a 60° angle. The steps he followed to draw the angle are shown.

Which error, if any, did Basem make when drawing his angle?

- A. He did not make any errors drawing the angle.
- B. He read the incorrect set of numbers on the protractor.
- C. He positioned the protractor incorrectly when marking the angle.
- D. He both read the incorrect set of numbers and positioned the protractor incorrectly when marking the angle.

Description	Steps
Draw a line	 Vertex
Measure	
Mark	 60°
Connect	 60°



Lesson (10): Drawing Angles with a Protractor:

For each angle, draw the angle using a protractor.

1. 25°

2. 155°

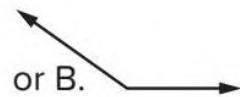
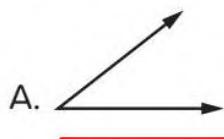
3. 72°

4. 15°

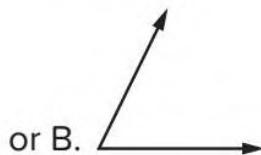


Which Angle Is It? For each angle measurement given, circle the picture of the angle that you think matches that measurement.

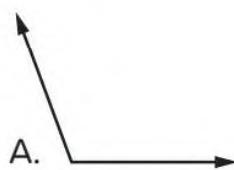
1. 45°



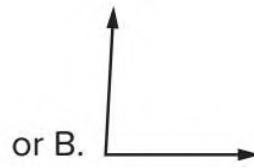
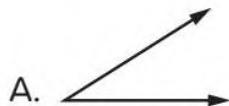
2. 60°



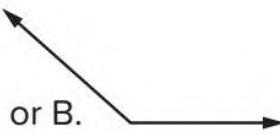
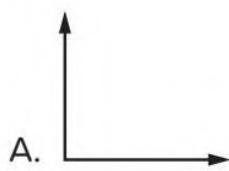
3. 125°



4. 85°



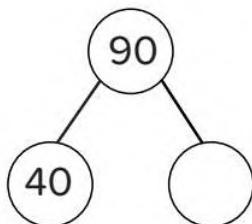
5. 150°



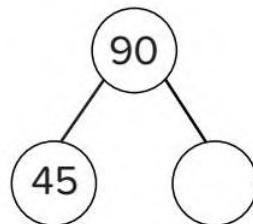
Lesson (11): Composing and Decomposing Angles:

Composing and Decomposing Numbers Identify and record the missing part of each addition/subtraction number bond.

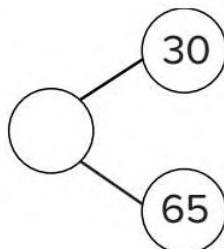
1.



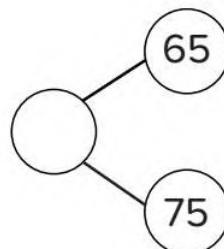
2.



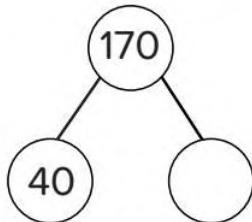
3.



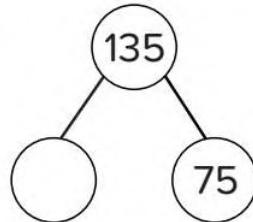
4.



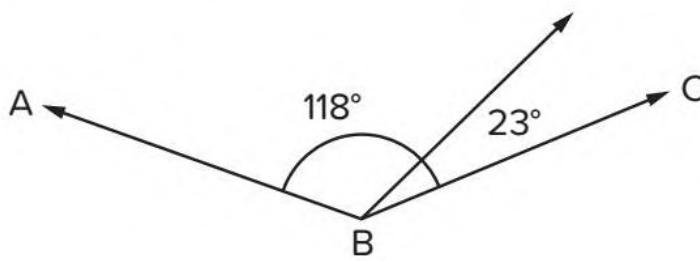
5.



6.

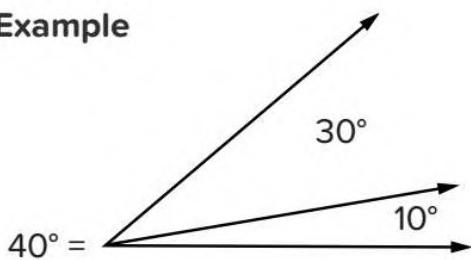


Find the measure of Angle ABC.

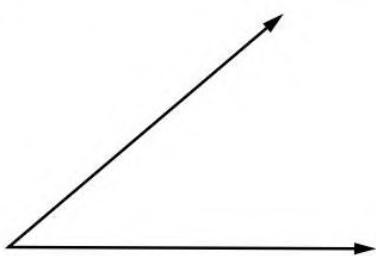


Composing and Decomposing Angles How can angles be composed and decomposed? Measure each of the angles and record the measurement. Then, use the information to answer the questions.

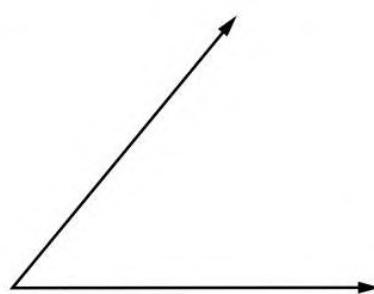
Example



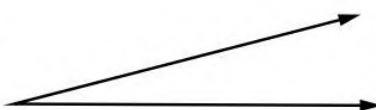
A.



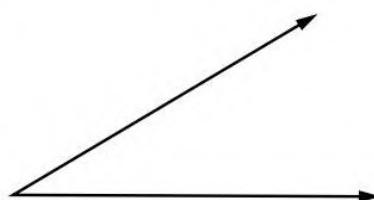
B.



C.



D.



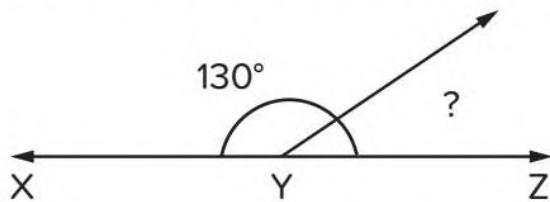
1. Abeer decomposed a 55° angle into two angles. Which two angles did Abeer use?
2. Zeina decomposed a 90° angle into two parts. One part is 60° . What angle represents the other part?
3. Nahla wants to make a 70° angle. Which two angles can Nahla use to compose a 70° angle?
4. Rashad composes a new angle using angles A, B, and C. What is the measurement of the new angle?
5. Nabil composes a new angle using a right angle and angle D. What is the measurement of the new angle?



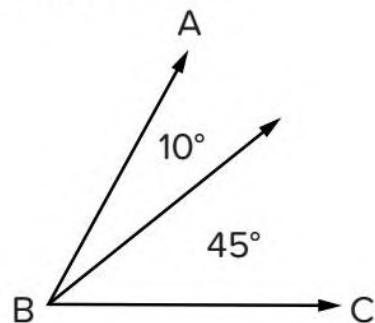
Lesson (12): Real-World Problems with Angles:

Find the Missing Angle Use your understanding of angles to answer each question.

1. Angle XYZ is a straight angle. What is the measure of the mystery angle?



2. What is the measure of the angle ABC?

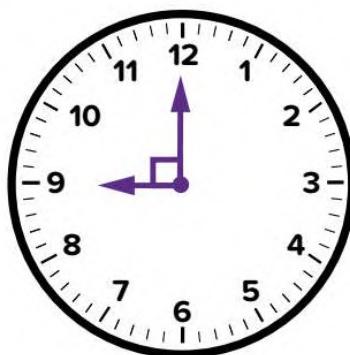


Gamal observed that the hands on a clock are rays and that they make angles. Write the time shown on each clock and the type of angle formed. Then, estimate the measure of each angle.

1.



2.



Time _____

Time _____

Type _____

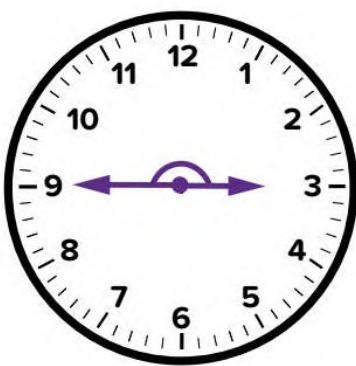
Type _____

Estimate _____

Estimate _____



3.



4.



Time _____

Time _____

Type _____

Type _____

Estimate _____

Estimate _____



Homework

Drawing Angles with a Protractor Use your protractor to draw an angle with the given measurement.

1. 58°

2. 27°

3. 94°

4. 148°

5. 106°

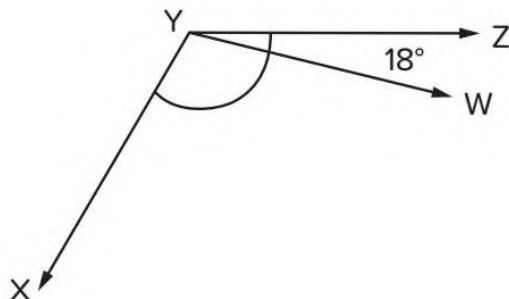
6. 172°

7. 122°

8. 78°



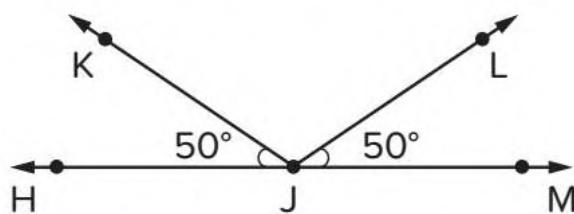
Angle XYZ measures 117° . What is the measure of Angle XYW?



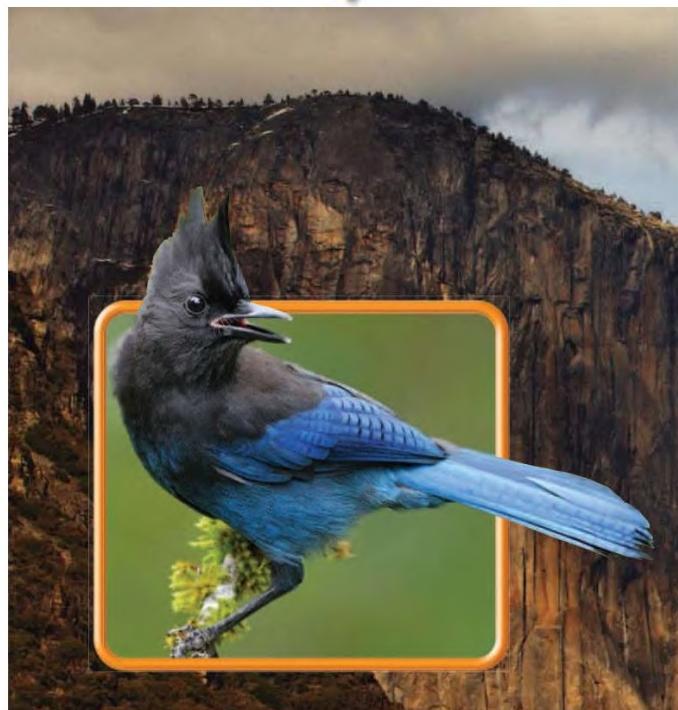
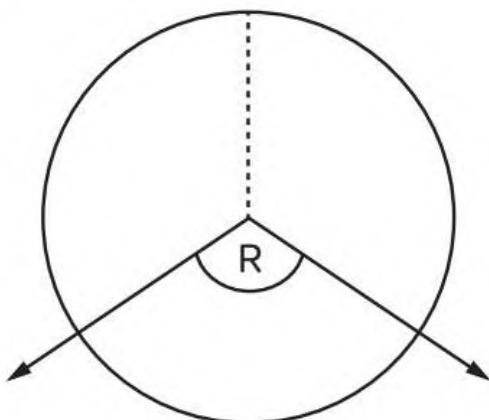
Ola split a right angle into five equal angles. What is the measure of each smaller angle?



The figure shows angle HJM. The measure of angle HJM is 180° . What is the measure, in degrees, of angle KJL?



Angle R turns through $\frac{1}{3}$ of the circle as shown. What is the measure, in degrees, of angle R?



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